



## PREFACE

Welcome to our monthly current affairs magazine! We are thrilled to provide you with the latest information and updates on the most important events that happened in our country and around the world in the month of June 2024. Our magazine is designed to help you prepare for competitive examinations like UPSC and other State PSC Exams, and we hope that you will find it informative, engaging, and useful.

In this magazine, you will find a wide range of topics covering current affairs, including politics, economics, sports, science and technology, and many more. Our team of writers and editors work hard to bring you the most accurate and up-to-date information, so you can stay informed and prepared for any competitive exam.

We understand that preparing for competitive exams can be a daunting task, but we are here to make it easier for you. Our magazine is designed to be easy to read and understand, with clear and concise articles that will help you stay on top of the latest news and events.

We believe that knowledge is power, and we are committed to helping you achieve your goals. Whether you are preparing for a government job, entrance exam, or any other competitive exam, our magazine will provide you with the information and insights you need to succeed.

Thank you for choosing our magazine, and we hope that you find it helpful and informative.



## ACKNOWLEDGMENTS

We extend our heartfelt gratitude and appreciation to the exceptional team of content developers who have played a pivotal role in shaping our UPSC Current Affairs Magazine. Your unwavering dedication, extensive research, and commitment to delivering high-quality content have been instrumental in making this publication a trusted resource for our readers.

Your relentless pursuit of current affairs, profound understanding of complex issues, and the ability to distil them into informative, concise, and engaging articles have set a benchmark in the field of competitive examination preparation.

We are proud to have a team that goes above and beyond, ensuring that our readers are well-informed and well-prepared for the UPSC examinations. Your exceptional contributions are the driving force behind our magazine's success.

Thank you for your hard work, expertise, and passion for delivering top-notch content. Your efforts have not only enriched our magazine but have also played a significant role in the educational journey of countless aspiring civil servants.

We look forward to continuing this remarkable journey of knowledge dissemination with your continued support and excellence.

With deep appreciation,

**EKAM IAS ACADEMY**



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## POLITY

### I. JUDICIARY

#### 1. SC DECLINES PLEA AGAINST COLLEGIUM SYSTEM TO PROTECT PUBLIC'S BEST INTEREST

##### SOURCE: THE HINDU

Recently, two senior-most district judges have approached the Supreme Court, alleging that the Himachal Pradesh High Court collegium disregarded their merit and seniority in the judicial selection process.

- This incident raises concerns about the adherence to the Supreme Court-devised procedure for appointing High Court judges.
- Earlier in April, the Supreme Court registry declined to accept a petition seeking to abolish the collegium system of judicial appointments and reinstate the National Judicial Appointments Commission (NJAC).

##### Evolution of the Collegium System

The collegium system is a method of appointing and transferring judges that has evolved through Supreme Court judgments rather than through an Act of Parliament or constitutional provisions.

##### Constitutional Articles:

- **Article 124(2):** Deals with the appointment of Supreme Court judges.
- **Article 217:** Pertains to the appointment of High Court judges.

##### Key Judgments:

- **First Judges Case (1981):** Established the supremacy of the executive in judicial appointments.
- **Second Judges Case (1993):** Reversed the First Judges Case, establishing the primacy of the judiciary in appointments through the collegium system.
- **Third Judges Case (1998):** Expanded the collegium to include a larger number of senior judges for transparency and broader consensus.

##### Structure of the Collegium System

- **Appointment of Supreme Court Judges:** Involves the Chief Justice of India (CJI) and the four senior-most judges of the Supreme Court.
- **Appointment of High Court Judges:** Involves the CJI and the two senior-most judges of the Supreme Court.
- **Transfer of High Court Judges:** Involves the CJI, the four senior-most judges of the Supreme Court, and the judges of the two concerned High Courts.

##### Issues Related to the Collegium System

##### Exclusion of the Executive:

- The executive is completely excluded from the process, leading to a system where a few judges appoint others in secrecy.
- Lack of accountability may result in the wrong choice of candidates.

##### Favoritism and Nepotism:

- Absence of specific criteria for selection can lead to nepotism and favoritism.
- Allegations of favoritism in appointments, as seen in the Himachal Pradesh case.

##### Violation of Checks and Balances:

- **The collegium system concentrates power within the judiciary**, violating the principle of checks and balances.
- Lack of external oversight can lead to potential misuse of power.

##### Lack of Transparency:

- The collegium system is criticized for its opaque functioning, with no official records or minutes of meetings.
- **Decisions are made behind closed doors**, creating a perception of secrecy and reducing public trust in the judiciary.

##### Unequal Representation:

- The higher judiciary is criticized for its lack of diversity, particularly the underrepresentation of women and marginalized communities.

##### Way Forward

##### Ensuring Transparency and Objectivity:

- **Develop clear and objective criteria for judicial selection**, emphasizing merit, seniority, and diversity.
- Implement mechanisms to **record and publish collegium decisions** while protecting legitimate privacy concerns.

##### Balancing Independence and Accountability:

- Involve the government in the appointment process without compromising judicial independence. This could include a consultative mechanism or a time-bound confirmation process.

##### National Commission to Review the Working of the Constitution (NCRWC) Recommendations:

##### Establish a National Judicial Commission under the Constitution.

- A committee of the National Judicial Commission to examine complaints against Supreme Court and High Court judges.
- **Set up a National Judicial Council and Judicial Councils in states for planning and budgeting.**

##### Promoting Diversity:

- Implement affirmative action measures to increase the representation of women, minorities, and disadvantaged groups in the judiciary.



- **Address the issue of nepotism or the 'Uncle Judges' syndrome, as recommended by the Law Commission of India (230th Report),** by ensuring judges are not appointed to High Courts where their family members practice.

### MAINS QUESTION

Q. Discuss the challenges associated with the collegium system of judicial appointments in India and suggest measures to improve transparency, accountability, and diversity in the judiciary. (150 WORDS)

## II. POLICIES / SCHEMES / ACTS / REPORTS / COMMITTEES IN NEWS

### 2. RECOGNISE 'THIS LEAVE' AS A WOMAN'S RIGHT

#### SOURCE: THE HINDU

Legislative efforts for menstrual leave in India have seen advocacy through Private Member Bills, with varying provisions aimed at recognizing menstruation as a natural process and promoting gender equality.

#### About Menstrual Leave:

Menstrual leave refers to the provision of paid or unpaid leave from work or school for individuals experiencing menstruation-related discomfort or challenges.

- **Purpose:** It aims to address the unique needs of individuals during menstruation and promote gender equality by recognizing menstruation as a natural biological process.
- **Legislation Efforts:** Various legislative efforts have been made globally and within India to institutionalize menstrual leave as a right for women.

#### Legislative Efforts in India

- **Private Member Bills:** Several Members of Parliament (MPs) in India have introduced Private Member Bills advocating for menstrual leave, including S. Jothimani, Ninong Ering, Shashi Tharoor, and Hibi Eden.
- **Content of Bills:** These Bills typically propose provisions such as paid leave for a specified number of days, rights to menstrual hygiene management facilities, and penalties for refusal of leave.
- **Supreme Court Response:** The Supreme Court of India has deemed menstrual leave as a policy matter within the government's domain, **declining to entertain a public interest litigation seeking direction on the issue.**

#### Progressive States and International Comparisons

- **Kerala's Initiatives:** Kerala has a historical precedent for menstrual leave dating back to 1912 and has continued to implement progressive

measures, including introducing menstrual and maternity leave for students above 18.

- **Asian Countries:** Several Asian nations, such as **Japan, Indonesia, South Korea, Taiwan, and Vietnam, have implemented** menstrual leave policies, demonstrating international recognition of menstrual health as a priority.
- **Global Advocacy:** International organizations like the **International Labour Organization (ILO) and the World Health Organization (WHO) have advocated for menstrual leave as a women's right,** urging nations to recognize and address menstrual health issues.

### FUNDAMENTAL RIGHTS AND WOMEN'S EMPOWERMENT

- Equality & Non-discrimination (Articles 14, 15):
- **Equal Treatment:** Women are guaranteed equal treatment before the law (Article 14).
- **Anti-discrimination:** Discrimination based solely on sex is prohibited (Article 15(1)).
- **Affirmative Action:** The state can take steps to uplift women by making positive discrimination policies (Article 15(3)).
- **Equal Opportunity (Article 16):** Women have equal rights to government jobs and cannot be discriminated against on the basis of sex.
- **Right to Dignity (Article 21):** This article protects a woman's right to be treated with respect and decency.
- **Anti-Trafficking (Article 23):** Prohibits human trafficking, including the exploitation of women through prostitution.

### DPS PROVISIONS ON WOMEN EQUALITY AND EMPOWERMENT

- **Article 39** mandates that the State ensures parity in remuneration for men and women performing similar tasks.
- **Article 42** obliges the State to establish fair and compassionate working conditions, alongside maternity support.
- **Article 44** instructs the State to implement a uniform civil code across the nation, guaranteeing women equal rights in personal affairs like marriage and inheritance.
- **Article 45** requires the State to deliver early childhood care and education, including for female children, until they turn six.

#### Government Initiatives for Period Health

India implements various programs to improve menstrual hygiene management (MHM) for adolescent girls and women. These initiatives address education, access to sanitary products, and sanitation facilities.

- **Education and Awareness:** The Right to Children to Free and Compulsory Education Act (RTE) lays the



groundwork for integrating MHM education into school curriculums. **Additionally, guidelines by the Ministry of Drinking Water and Sanitation promote awareness campaigns.**

- **Sanitary Products:** The National Health Mission's Scheme for Promotion of Menstrual Hygiene provides subsidized sanitary napkins to adolescent girls in rural areas.
- **Sanitation Infrastructure:** Programs like Swachh Bharat Mission (Clean India Mission) and Swachh Bharat: **Swachh Vidyalaya (Clean India: Clean Schools)** focus on building toilets and handwashing facilities in schools and communities, crucial for proper MHM.

### Need for Greater Gender Sensitivity and Policy Solutions

- **Gender Inequality:** Policy solutions addressing gender inequalities should consider the differentiated experiences of women due to socio-cultural and biological factors, including menstruation.
- **Taboo Reduction:** Discussions and policies surrounding menstruation contribute to breaking taboos and promoting a more gender-sensitive society that acknowledges previously marginalized issues.
- **Political Recognition:** Political parties acknowledging menstrual leave in their manifestos signify a crucial step towards promoting women's rights and gender equality in the public domain.

### MAINS QUESTION:

Q. Discuss the significance of menstrual leave policies in promoting gender equality and women's rights in India. (150 WORDS)

### 3. DOES PMJAY NEED A DESIGN CHANGE?

#### SOURCE: THE HINDU

India's flagship health insurance scheme, Ayushman Bharat PMJAY, has shown some success but faces challenges in achieving Universal Health Coverage (UHC) due to limitations in its design and implementation.

#### Challenges of PMJAY:

- **Hospital capacity:** Not enough empanelled hospitals, especially in some states, leading to burden on existing ones.
- **Payment Delays:** Hospitals facing delays in claim reimbursements from the government.
- **Claim rejections:** Hospitals rejecting claims due to technicalities or documentation errors.
- **Public vs. Private care:** Patients preferring private hospitals despite potential for unnecessary procedures due to perceived better quality compared to public options.

- **Focus on hospitalization:** PMJAY primarily covers hospitalization costs, neglecting outpatient care, diagnostics, and medicines.

#### Design Flaws:

- **Lack of network adequacy:** Unlike other insurance schemes, PMJAY doesn't ensure sufficient hospitals are available near beneficiaries.
- **Fragmented healthcare landscape:** PMJAY operates as an additional layer on top of existing public healthcare systems, potentially increasing complexity.

#### Alternative Solutions:

- **Strengthening public health system:** Investments needed to improve public hospitals and regain patient trust.
- **Pooling government health funds:** Combining central and state government health expenditures for a more significant impact.
- **Focus on outpatient care:** Expanding coverage to include diagnostics, medicines, and preventive care.
- **Public sector purchaser-provider split:** Implementing a system where the government sets budgets and holds public hospitals accountable for performance.

#### AYUSHMAN BHARAT-PMJAY: INDIA'S LARGE-SCALE HEALTH INSURANCE INITIATIVE

Ayushman Bharat-PMJAY (Pradhan Mantri Jan Arogya Yojana) is a government-funded health insurance program launched in India in 2018.

- **It's known for being the world's largest scheme of its kind.**

#### What does it cover?

- PM-JAY provides families with an annual health insurance coverage of Rs. 5 lakh.
- This covers expenses related to **secondary and tertiary care hospitalization**, including surgeries, medical and day care treatments, medications, and diagnostics.

#### Who benefits?

- The program is designed to be accessible to those who need it most.
- Beneficiaries are identified through the latest **Socio-Economic Caste Census (SECC) data**.
- However, states have flexibility to include additional families with similar socio-economic backgrounds.

#### Funding and Management

- Funding for PM-JAY is **shared between the central government and states/UTs**. The National Health Authority (NHA) oversees the program's implementation in collaboration with state governments.





- State Health Agencies (SHAs) are responsible for executing the scheme within each state.

#### Key Points:

- PMJAY has helped reduce out-of-pocket expenditure but hasn't achieved universal health coverage.
- The current design may not be sustainable due to limitations and challenges.
- Strengthening public healthcare and reforming financing models are crucial for long-term success.

#### Advantages of Ayushman Bharat-PMJAY:

- **Financial Protection:** Offers significant financial security for low-income families by covering hospitalization costs up to Rs. 5 lakh per year.
- **Universal Coverage:** Aims to provide health insurance to a large portion of the population, reducing the burden of out-of-pocket medical expenses.
- **Improved Access to Healthcare:** Encourages utilization of secondary and tertiary healthcare services, which might have been previously unaffordable.
- **Reduced Out-of-pocket Expenditure:** By covering hospitalization costs, PM-JAY helps families avoid financial burdens associated with medical emergencies.
- **Prevents Debt:** Mitigates the risk of families falling into debt due to unexpected medical bills.
- **Increased Treatment Options:** Empowers beneficiaries to seek necessary medical care without worrying about financial constraints.

#### MAINS QUESTION:

Q. Critically analyse the design and implementation challenges faced by the Ayushman Bharat-PMJAY scheme and suggest reforms to enhance its effectiveness in achieving Universal Health Coverage in India. (150 WORDS)

#### 4. STREET VENDORS ACT, 2014

##### SOURCE: INDIAN EXPRESS

The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, enacted on May 1, 2014, aimed to legalize and regulate the rights of street vendors in urban areas.

It sought to protect the livelihoods of street vendors while ensuring orderly vending in cities through a participatory governance structure.

##### Key Provisions of the Act:

##### Legalization of Vending Rights:

- The Act legalizes the vending rights of street vendors, providing them with a framework for conducting their business in urban areas.

##### Protection and Regulation:

- It aims to protect the livelihoods of street vendors while regulating street vending activities in cities.

##### State-Level Rules and Schemes:

- The Act provides for the formulation of State-level rules and schemes to govern street vending, ensuring uniformity and consistency in regulations across different regions.

##### Roles and Responsibilities:

- The Act clearly delineates the roles and responsibilities of street vendors and various levels of government, including Urban Local Bodies (ULBs).

##### Accommodation of Existing Vendors:

- It commits to accommodating all existing street vendors in designated vending zones and issuing vending certificates (VCs) to eligible vendors.

##### Participatory Governance Structure:

- The Act establishes Town Vending Committees (TVCs) to facilitate participatory decision-making in the regulation of street vending.
- **Street vendor representatives must constitute 40% of TVC members**, with a sub-representation of 33% for women street vendors.

##### Grievance Redressal Mechanisms:

- Mechanisms for addressing grievances and disputes are outlined in the Act, including the establishment of Grievance Redressal Committees chaired by civil judges or judicial magistrates.

##### Periodic Surveys:

- States and ULBs are required to conduct surveys at least once every five years to identify street vendors and ensure their inclusion in vending zones.

##### Impact of the Act:

- **The Act has provided legal recognition and protection to the livelihoods of street vendors, enhancing their socio-economic status.**
- It has promoted inclusive governance through the establishment of TVCs, ensuring the representation of street vendors in decision-making processes.
- **By formalizing vending zones and issuing vending certificates, the Act has brought a level of organization and order to street vending activities in urban areas.**
- Grievance redressal mechanisms outlined in the Act have empowered street vendors to seek recourse in case of disputes or violations of their rights.
- **Periodic surveys conducted under the Act help in updating information about street vendors and ensuring their continued inclusion in vending zones.**



## III. PRELIMS POINTERS IN NEWS

### 5. VIBRANT VILLAGE PROGRAMME

#### SOURCE: BUSINESS STANDARD

The Vibrant Village Programme is a Centrally Sponsored Scheme aimed at comprehensive development of villages and blocks along the northern border of India.

- Implemented from the financial years 2022-23 to 2025-26, its objective is to enhance the quality of life for residents in identified border villages.
- By improving infrastructure and creating livelihood opportunities, the program aims to encourage people to remain in their native villages, thereby addressing outmigration and bolstering border security.
- It covers 2967 villages in 19 districts and 46 border blocks across Arunachal Pradesh, Sikkim, Uttarakhand, Himachal Pradesh, and the UT of Ladakh.
- Key interventions include promoting tourism and cultural heritage, skill development, entrepreneurship, and cooperative societies such as agriculture and horticulture.
- Infrastructure development includes road connectivity, housing, energy (including renewable energy), television, and telecom connectivity.
- Vibrant Village Action Plans will be developed by district administrations with the involvement of Gram Panchayats, ensuring 100% saturation of Central and state schemes while avoiding overlap with the Border Area Development Programme.

### 6. GENERAL PROVIDENT FUND (GPF) SCHEME

#### SOURCE: INDIAN EXPRESS

Recently, a single judge bench of the Madras High Court made a significant ruling regarding pension benefits tied to the General Provident Fund (GPF) scheme.

This ruling clarified that employees don't automatically receive pension benefits solely based on their deductions made under the GPF scheme.

#### General Provident Fund (GPF):

- A specialized form of the Public Provident Fund (PPF) exclusively available for government employees in India.
- Allows government employees to allocate a portion of their salaries into their GPF accounts.
- Upon retirement, employees receive the accumulated corpus from their GPF accounts, reflecting their contributions over their service tenure.

#### Eligibility and Contribution:

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- Temporary government servants with at least one year of continuous service, re-employed pensioners (excluding those eligible for the contributory provident fund), and permanent government servants are eligible to subscribe to GPF accounts.
- Contributions to the GPF scheme are mandatory, with a certain percentage deducted from the employee's monthly salary. These contributions earn interest at a predetermined rate.
- Employees have the option to increase their GPF deductions according to their preferences.

#### Withdrawal and Benefits:

- Employees can withdraw their savings from the GPF upon retirement, resignation, or for various reasons like marriage, education, and medical emergencies.
- Loans against GPF accounts are permitted under specific conditions.
- Upon the employee's demise, the GPF sum is paid to their nominee.

#### Administration and Advantages:

- Administered by the Department of Pension and Pensioners' Welfare under the Ministry of Personnel, Public Grievances, and Pensions.
- Offers benefits such as tax savings, low-risk investments, and guaranteed returns for government employees.

### 7. THE INDIAN CYBER CRIME COORDINATION CENTRE (I4C)

#### SOURCE: HINDUSTHAN TIMES

The Indian Cyber Crime Coordination Centre (I4C), under the Ministry of Home Affairs (MHA), aims to combat cybercrime in India through coordinated efforts. It focuses on enhancing coordination among Law Enforcement Agencies (LEAs) and stakeholders.

#### Location:

- Situated in New Delhi, I4C serves as a central hub for addressing cybercrime-related issues nationwide.

#### Functions:

- Acts as a focal point in the fight against cybercrime.
- Conducts research and development activities to develop new technologies and forensic tools in collaboration with academia and research institutes.
- Prevents the misuse of cyberspace by extremist and terrorist groups.
- Recommends amendments to cyber laws to keep pace with evolving technologies.
- Coordinates activities related to Mutual Legal Assistance Treaties (MLAT) with other countries in combating cybercrimes.



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## Components:

- **National Cybercrime Threat Analytics Unit (TAU):** Reports cybercrime threats regularly.
- **National Cybercrime Reporting Portal (NCRP):** Allows citizens to report cybercrime complaints nationwide.
- **National Cybercrime Training Centre (NCTC):** Provides training to government officials, especially state law enforcement agencies.
- **National Cybercrime Research and Innovation Centre:** Conducts research for developing indigenous cybercrime prevention tools.
- **Platform for Joint Cyber Crime Coordination Team:** Facilitates coordination and information sharing among LEAs.
- **Cybercrime Ecosystem Management Unit:** Raises awareness about cyber hygiene.
- **National Cybercrime Forensic Laboratory (Investigation) Ecosystem:** Assists LEAs in cyber forensics investigation.

## Initiatives:

- **Cyber Crime Volunteers Program:** Engages citizens to contribute to the fight against cybercrime.
- **Citizen Financial Cyber Fraud Reporting and Management System:** Facilitates immediate reporting of financial cyber frauds.
- **National Toll-free Helpline number '1930':** Provides citizen assistance in lodging online cyber complaints.
- **CyberDost handle on social media:** Raises cyber awareness among citizens.

## 8. MATUA COMMUNITY

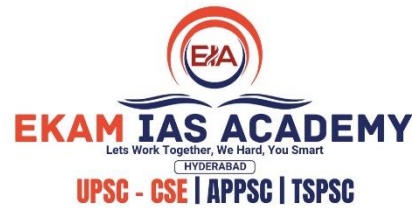
### SOURCE: INDIAN EXPRESS

The Matua community has been demanding the implementation of the Citizenship Amendment Act, 2019, which offers citizenship to persecuted minorities from neighboring countries, including Hindu refugees from Bangladesh.

### Matua Community and Citizenship Amendment Act (CAA):

- **Identity:** Matuas are Bengali Hindus belonging to the Scheduled Caste group in West Bengal.
- **Migration:** Millions migrated to India before and after the 1971 Bangladesh Liberation War to escape religious persecution.
- **Population:** Namasudras (Matuas) represent 17.4% of the total Scheduled Caste population in West Bengal, making them the second-largest group after Rajbanshis.
- **Founder:** Harichand Thakur, a social reformer, established the Matua Mahasangha to fight caste oppression and promote education and social upliftment.

- **Significance:** Implementation of CAA is seen as a means to provide legal recognition and rights to Matuas who migrated due to religious persecution.



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## CAN PARTIES BE DE-RECOGNISED OR DE-REGISTERED?

The Election Commission of India (ECI) recently emphasized the importance of star campaigners adhering to the Model Code of Conduct (MCC) to maintain societal harmony. This has sparked a debate on the ECI's authority to enforce MCC violations and its ability to deregister parties.

### Derecognition of Political Parties

#### About Derecognition

- Derecognition is the withdrawal of recognition status of a political party by the ECI.
- Impact:** Derecognized parties become registered-unrecognised parties. They can still contest elections but lose the privileges associated with recognized status.



#### Criteria for Recognized Party

- Registered Party:** Known as Registered Unrecognised Political Party (RUPP).

#### Recognition Criteria:

- National Party:** Must win a requisite number of seats and/or a certain percentage of votes in a general election to the Lok Sabha (LS) or State Assembly (SA).
- State Party:** Similar criteria but on a state level.

#### Current Recognized Parties

- National Parties:** There are six recognized national parties.
- State Parties:** Sixty-one recognized state parties.

#### Privileges:

- Reserved election symbol.
- Forty-star campaigners.
- Access to state-owned media during elections since 1998.

#### Grounds for Derecognition

- Failure to Secure Votes:** If a party fails to obtain at least 6% of the total votes or does not elect at least 4 MPs in the Lok Sabha or secure at least 1 seat in the Lok Sabha from the same state.
- Parliamentary Representation:** If it does not secure 2% of the total LS seats from at least 3 states.
- Valid Votes:** Failure to secure 8% of the total valid votes in the state during a General Election.
- Administrative Lapses:** Not submitting audited accounts or holding organizational elections on time.

#### Legal Provision

- Paragraph 16A of the Symbols Order, 1968:** ECI can suspend or withdraw recognition if a party fails to observe the MCC or follow the Commission's lawful directions.

#### Deregistration of Political Parties

##### About Deregistration

Deregistration means the cancellation of a political party's registration. The ECI currently lacks the power to deregister political parties.

##### Registered Parties

- Section 29A of the RP Act, 1951:** Sets the requirements for a party to register with the ECI, including a constitution that aligns with India's principles of socialism, secularism, democracy, and national integrity.

##### Legal Benefits

- Tax Exemptions:** Donations received are tax-exempt under Section 13A of the Income Tax Act, 1961.
- Common Symbol:** Allows the use of a common symbol in elections.
- Star Campaigners:** Twenty-star campaigners during election campaigns.

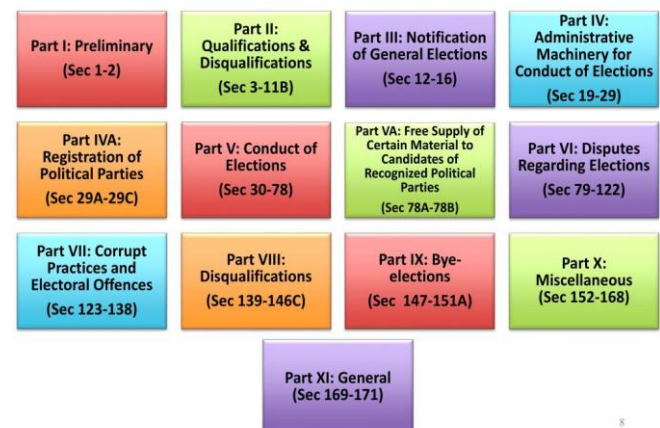
##### Grounds for Deregistration

- Fraudulent Registration:** Registration obtained by fraud.
- Illegal Declaration:** Declared illegal by the Central Government.
- Non-Compliance:** Refusal to comply with the Indian Constitution.

##### Supreme Court Verdict

- Indian National Congress vs. Institute of Social Welfare, 2002:** The Supreme Court ruled that the ECI does not have the power to deregister a political party under the RP Act.

### Representation of the People's Act 1951







## Need for Deregistration of Political Parties

### Participation in Elections

- **Inactive Parties:** Less than one-third of RUPPs participate in elections, raising concerns about misuse.

### Financial Misuse

- **Tax Exemptions:** Potential misuse of tax exemptions and donations for money laundering.

### MCC Violations

- **Breaching MCC:** Recognized parties often violate MCC, but the ECI's powers to penalize are limited.

### Electoral Integrity

- **Inactive Entities:** Deregistration ensures accountability and transparency by removing inactive parties.

### Democratic Dilution

- **Electoral Process:** Proliferation of inactive parties dilutes the electoral process, undermining genuine participation.

### Way Forward

#### Electoral Reforms:

- **ECI's Proposal:** In 2016, the ECI suggested amending the law to empower it to deregister parties.
- **Law Commission's Recommendations:** The 255th report (2015) recommended amendments to deregister parties that fail to contest elections for ten consecutive years.

#### Identification of Inactive Parties:

- **2016 Initiative:** The ECI initiated identifying parties that had not fielded candidates from 2005 to 2015 to discourage the formation of inactive parties.

#### Regular Audits:

- **Regular Exercise:** Regular identification and deregistration of inactive parties to maintain transparency.
- **National Electoral Fund:** Suggested by former Chief Election Commissioner T.S. Krishnamurthy as an alternative to state funding, this fund would accept contributions from all donors and allocate funds to parties based on election outcomes.

#### Maintenance of Accounts:

- **Section 78A Proposal:** The 170th Law Commission report recommended penalties for political parties failing to maintain accounts.

#### ECI's Powers:

- **Auditing Accounts:** Empowering the ECI to audit party accounts to ensure greater transparency and adherence to regulations.

#### Conclusion

Ensuring that political parties adhere to the Model Code of Conduct and other electoral regulations is crucial for maintaining the integrity of India's democratic process.

**By empowering the Election Commission of India with the authority to deregister inactive and non-compliant parties, the electoral process can be made more transparent and accountable.**

Regular audits and stringent checks on financial activities will help curb misuse and enhance the credibility of the electoral system.

#### MAINS QUESTION:

Q. Discuss the significance of the Election Commission of India's (ECI) authority to derecognize and deregister political parties in ensuring electoral integrity and accountability in the democratic process. (150 WORDS)



## INTERNATIONAL RELATIONS

### I. INDIA AND ITS NEIGHBOURHOOD

#### 1. MANIPUR ACCOUNTED FOR 97% OF DISPLACEMENTS IN SOUTH ASIA

##### SOURCE: THE HINDU

In 2023, South Asia witnessed significant internal displacements due to conflict and violence, with a notable concentration in India. A major contributing factor was the ethnic violence in Manipur, which alone accounted for 67,000 displacements.

The Geneva-based Internal Displacement Monitoring Centre (IDMC) reported a total of 69,000 displacements in the region, the highest in India since 2018.

##### Manipur Conflict

- **Event:** On May 3, 2023, a 'Tribal Solidarity March' in Manipur's hill districts protested the Meitei community's demand for Scheduled Tribe (ST) status.
- **Clashes:** The march led to ethnic clashes between the Meitei and Kuki communities, resulting in over 200 deaths.
- **Court Involvement:** Manipur High Court had called for the Meitei community to be recognized as a ST, causing tension with other local STs like the Kukis.
- **Underlying Issues:** Land disputes and resistance from existing STs were significant factors.

##### Displacement Statistics

- **Primary Locations:** Most displacements were within Manipur, with some people moving to Mizoram, Nagaland, and Assam.
- **Government Response:** Curfews, internet shutdowns, security deployment, relief camps, and a peace committee were established.

##### Broader Context

- 68.3 million people were displaced worldwide due to conflict and violence by the end of 2023.
- **Other Major Conflicts:** Significant displacements occurred in Sudan, the Democratic Republic of Congo, and the Palestinian territories.
- **Comparison:** Sudan saw six million displacements in 2023, the second-highest after Ukraine's 16.9 million in 2022.

##### THE ROHINGYA CRISIS:

- **Roots of displacement:** The Rohingya have faced persecution in Myanmar for decades, denied citizenship and basic rights. Military crackdowns

in 2017 escalated dramatically, with allegations of mass killings, rape, and burning of villages.

- **Scale of displacement:** Over 700,000 Rohingya fled to Bangladesh, creating massive refugee camps with strained resources.
- **Current situation:** The Rohingya remain stateless and largely confined to the camps in Bangladesh. Repatriation efforts haven't been successful due to security concerns in Myanmar.

##### Natural Disasters

- **Combined Impact:** Including natural disasters, total internally displaced persons reached 75.9 million by the end of 2023. This was an increase from 71.1 million at the end of 2022.
- **The Global Report on Internal Displacement 2023 (GRID-2023) indicated that in 2022, more than 32 million people were displaced due to disasters, with 98% of these displacements caused by weather-related events such as floods and storms.**

##### Internal displacement

Internal displacement occurs when individuals are compelled to vacate their residences but remain within the confines of their nation's borders.

##### Factors of Displacement

- Conflict and Violence
- Development Projects
- Disasters
- Climate Change

**Internal displacement is characterized by two main components:**

- **Involuntary Movement:** The movement is not by choice.
- **Internal Boundaries:** The displaced individuals remain within their country's borders.

##### Difference from Refugee

- Unlike refugees, internally displaced people (IDPs) have not crossed international borders and are not protected by international conventions.

##### Challenges Faced by IDPs

- Threat of physical attacks
- Sexual- or gender-based violence
- Family separation
- Lack of adequate shelter
- Insufficient food and health services
- Limited access to livelihoods

##### Internal Displacement in India – Policy Framework

- India lacks a national policy or legal framework to address the issues of refugees or IDPs.
- The country has not ratified the 1951 Refugee Convention or the 1967 Protocol.
- India does not permit the United Nations High Commissioner for Refugees (UNHCR) access to most refugee groups.

##### Factors of Internal Displacement in India



- Secessionist movements
- Identity-based autonomy movements
- Localized violence
- Environmental factors
- Development-induced displacement

### MAINS QUESTION:

Q. Examine the causes and consequences of internal displacement in India, with a focus on the recent ethnic violence in Manipur. (150 WORDS)

## II. AGREEMENTS INVOLVING INDIA AND/OR AFFECTING INDIA'S INTERESTS.

### 2. THE MISSING LINKS IN IMEC, AS SHOWN BY THE GAZA WAR

#### SOURCE: THE HINDU

The Chabahar Port Agreement, signed on May 13, 2024, symbolizes a decade-long collaborative effort between India and Iran to develop a vital maritime link that connects India with Afghanistan and Central Asia. This agreement is not merely a bilateral endeavour but a critical component of regional economic integration and trade facilitation.

#### India-Middle East-Europe Corridor (IMEC)

- **Announcement:** Signed at the G-20 summit in New Delhi on September 9, 2023.
- **Participants:** European Union, France, Germany, India, Italy, Saudi Arabia, UAE, and the US.

#### Objective:

- Stimulate economic development.
- Enhance connectivity and integration between Asia, the Arabian Gulf, and Europe.

#### Components:

- **East corridor:** India to Arabian Gulf.
- **Northern corridor:** Arabian Gulf to Europe.
- Includes a railway network, electricity and digital cables, and a clean hydrogen pipeline.
- **Ports Involved:** Indian ports (Kandla, Mumbai, Mundra) linked to UAE ports (Fujairah, Jebel Ali, Abu Dhabi), Saudi Arabia, Jordan, Israel (Haifa), France (Marseille), Italy (Messina), and Greece (Piraeus).

#### Impact of Gaza War

- **Delay in Implementation:** The Gaza war, starting on October 7, 2023, stalled the project.
- **Concerns:** Security issues due to conflicts affecting trade routes.

#### Challenges and Solutions

- **Houthi in Yemen:** Blocking Red Sea access for Israel and allies.
- **Strait of Hormuz:** Iranian threats to close it, impacting oil and gas shipping.

- **Port Security:** Eilat and Haifa in Israel targeted during Gaza war.

#### Alternative Routes:

- **Oman:** Ports outside the Persian Gulf, safer from Iranian threats.
- **Egypt:** Mediterranean ports providing safe, direct routes to Europe.

#### Strategic Importance

- **Counter to China's BRI:** Enhances regional stability and connectivity.
- **Economic Benefits:** Reduces transit time and cost for India-Europe trade by 40% and 30%, respectively.
- **Geopolitical Balance:** Oman and Egypt can stabilize and secure the corridor.

#### Importance of IMEC to India

##### Economic Benefits

- **Trade Efficiency:** IMEC is expected to significantly reduce the time and cost of transporting goods between India and Europe by 40% and 30%, respectively.
- **Enhanced Market Access:** Improves access to European and Middle Eastern markets, boosting exports and economic growth.
- **Supply Chain Security:** Diversifies trade routes, reducing dependency on the Suez Canal and mitigating risks from geopolitical tensions.

##### Strategic Significance

- **Geopolitical Influence:** Strengthens India's strategic presence in the Middle East and Europe, countering China's Belt and Road Initiative (BRI).
- **Regional Integration:** Enhances India's role in regional economic and infrastructure projects, fostering stronger political and economic ties.
- **Energy Security:** Facilitates the transportation of clean hydrogen and other energy resources, contributing to India's energy diversification and sustainability goals.

##### Infrastructure Development

- **Rail and Road Connectivity:** Promotes the development of reliable and cost-effective rail and road networks, improving domestic and international logistics.
- **Digital and Energy Networks:** Includes the installation of digital and electricity cables, boosting India's technological and energy infrastructure.

##### Economic Growth

- **Investment Opportunities:** Attracts foreign investment in infrastructure, technology, and energy sectors.
- **Job Creation:** Generates employment opportunities through the development of new infrastructure projects and enhanced trade activities.



## SOME MULTINATIONAL MULTIMODAL PROJECTS OF INDIA:

- The Kaladan Multimodal Project is a waterway-road transportation route between India and Myanmar. It connects the eastern Indian seaport of Kolkata with Sittwe port in Myanmar by sea, then to Paletwa via Kaladan River, and finally to Mizoram in India by road. This project is expected to boost trade between the two countries and improve access to the North Eastern states of India.
- The Bangladesh-Bhutan-India-Nepal (BBIN) Corridor is a multi-modal transport corridor connecting Kolkata in India to Bhutan, Nepal, and Bangladesh. The corridor will use a combination of waterways, railways, and roads to improve connectivity and trade between the four countries.

## MAINS QUESTION:

Q. Analyze the strategic and economic significance of the India-Middle East-Europe Corridor (IMEC) for India, considering the challenges posed by regional conflicts and the potential solutions to ensure its successful implementation. (150 WORDS)

## 3. BIMSTEC ACQUIRES 'LEGAL PERSONALITY' AFTER CHARTER COMES INTO FORCE.

### SOURCE: INDIAN EXPRESS

The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) has gained significant momentum with the entry into force of its charter on May 20, 2024.

This milestone marks a new phase in regional integration and cooperation among the member states situated around the Bay of Bengal.

With the acquisition of legal personality, BIMSTEC is poised to engage more effectively with international organizations and deepen collaboration across various sectors for mutual benefit.

### What is BIMSTEC?

- BIMSTEC is an economic bloc formed through the Bangkok Declaration in June 1997, initially comprising Bangladesh, India, Sri Lanka, and Thailand.
- It aims to accelerate regional growth through cooperation in sectors such as trade, technology, energy, transport, tourism, fisheries, and climate change.
- Nepal and Bhutan later joined as full-time members, with Nepal initially serving as an observer state.

- The Permanent Secretariat of BIMSTEC is located in Dhaka, Bangladesh.

### Areas of Cooperation

- Initially, BIMSTEC focused on six sectors, including trade, technology, energy, transport, tourism, and fisheries.
- Currently, BIMSTEC has expanded to 14 priority areas of cooperation, with climate change being added as the 14th priority area in 2008.
- Member countries lead specific sectors of cooperation, with India leading initiatives in transport & communication, tourism, environment & disaster management, and counterterrorism & transnational crime.

### Importance of BIMSTEC

- BIMSTEC comprises seven member states with a combined GDP close to \$2.7 trillion and around 22% of the world's population.
- The region has sustained impressive economic growth rates, and a significant portion of global trade flows through the Bay of Bengal.
- The renewed focus on BIMSTEC, particularly by India, has elevated its importance as a regional forum for cooperation, especially in the aftermath of geopolitical events such as the Uri attack.

### Significance for Member Countries

- Each member country sees value in BIMSTEC for different reasons. Bangladesh aims to enhance its regional positioning, while Sri Lanka seeks connectivity with Southeast Asia.
- Landlocked countries like Nepal and Bhutan see BIMSTEC as an opportunity to connect with the Bay of Bengal region and reduce dependency on neighboring countries.
- For Myanmar and Thailand, deeper engagement with India through BIMSTEC offers access to new markets and a counterbalance to China's influence.

### Challenges

- Despite its potential, BIMSTEC faces challenges such as discord between member countries, particularly between Bangladesh and Myanmar due to the Rohingya refugee crisis.
- The bloc has also become a battleground for influence between India and China, with China's Belt and Road Initiative extending its reach into the region.
- However, with concerted efforts and effective cooperation, these challenges can be overcome to realize the full potential of BIMSTEC.

### BIMSTEC Charter Comes into Force

### Background





- The BIMSTEC charter was adopted during its 5th Summit in March 2022, signalling a commitment to deeper integration and cooperation.
- The charter was ratified by Nepal's parliament in April 2024, leading to its entry into force on May 20, 2024.

### Legal Personality and Diplomatic Dialogue

- With the charter coming into force, BIMSTEC has acquired a legal personality, granting it rights and duties in law.
- This legal status enables BIMSTEC to engage in structured diplomatic dialogue with other international groupings and countries.
- The charter provides a legal and institutional framework for meaningful cooperation and deeper integration of the Bay of Bengal region.

### Mains Question:

Q. Discuss the significance of the BIMSTEC charter for regional integration and cooperation among Bay of Bengal countries, and analyze the challenges faced by the bloc in realizing its full potential. (150 WORDS)

## 4. ANTARCTIC PARLIAMENT MEETS IN KOCHI: WHAT'S ON THE TABLE?

### SOURCE: INDIAN EXPRESS

India is currently hosting the 46th Antarctic Treaty Consultative Meeting (ATCM 46) in Kochi from May 20-30.

Organized by the National Centre for Polar and Ocean Research, Goa, under the Ministry of Earth Sciences (MoES), this meeting brings together the 56 member countries of the Antarctic Treaty.

### Antarctic Treaty Overview

- **Signatories:** Originally signed by 12 countries in 1959, including Argentina, Australia, Belgium, Chile, France, Japan, New Zealand, Norway, South Africa, the USSR, the United Kingdom, and the United States.
- **Purpose:** Designates Antarctica as a "no man's land," prohibiting militarization and fortifications, promoting peaceful purposes, scientific investigations, and cooperation among signatories.
- **Current Membership:** 56 countries, including India since 1983, have joined the treaty.

### India's Role in Antarctica

- **Consultative Party:** India has been a consultative party since 1983, participating in decision-making processes regarding Antarctica.
- **Research Stations:** India has three research stations in Antarctica:
  - Dakshin Gangotri: Established in 1983, operated until 1990.
  - Maitri: Established in 1989, still operational, located in the Schirmacher Oasis.

- **Bharati:** Inaugurated in 2012, focuses on oceanographic and geological studies, also used by ISRO for receiving satellite data.
- **Future Plans:** India plans to open a new station, Maitri II, by 2029.

### Agenda for ATCM 46

- **Global Dialogue:** Facilitates discussions on law, logistics, governance, science, tourism, and other aspects of Antarctica.
- **India's Priorities:** India seeks to promote peaceful governance, regulate tourism, and introduce the construction plan for Maitri II.
- **Tourism Regulations:** India proposes a new working group to regulate tourism in Antarctica, aiming to formulate regulations and track tourist activities.
- **Consensus Building:** Aims to reach a consensus with countries sharing similar views on tourism regulations.
- **Other Agenda Items:** Discussions on sustainable management of resources, biodiversity prospecting, research collaboration, capacity building, and climate change impacts on Antarctica and beyond.

### A Remote Land of Scientific Importance:

- Antarctica, Earth's southernmost continent, is a vast and uninhabited expanse (except for research stations).
- It's the fifth-largest continent, covering a staggering 14 million square kilometers.
- The South Pole sits proudly within its boundaries.

### India's Deep Dive into Antarctic Research:

India has established a strong presence in Antarctica, operating two permanent research stations:

- **Maitri (commissioned in 1989) at Schirmacher Hills**
- **Bharti (established in 2012) at Larsemann Hills**
- With a commitment to polar research, India has launched a remarkable 41 scientific expeditions to Antarctica to date.
- **Along with its Himadri station in Svalbard (Arctic), India joins an elite group of nations with research facilities in both polar regions.**

### A Legacy of Antarctic Exploration:

- India's Antarctic program boasts a rich history, with its official accession to the Antarctic Treaty System occurring in August 1983.
- This treaty highlights the international commitment to peaceful scientific research and environmental protection in Antarctica.

### Beyond the Highlighted Points:

While the provided passage offers a solid overview, here are some additional aspects of India's Antarctic connection to consider:

- **Scientific Focus:** India's research program delves into various Antarctic disciplines, including

atmospheric sciences, geology, biology, and oceanography.

- **International Collaboration:** India actively collaborates with other nations on Antarctic research endeavors.
- **Environmental Stewardship:** India plays a vital role in upholding the Antarctic Treaty System's principles of environmental protection in this fragile ecosystem.

### MAINS QUESTION:

Q. Examine India's role in Antarctic governance and its objectives in hosting the 46th Antarctic Treaty Consultative Meeting (ATCM 46) (150 WORDS)

## III. PRELIMS POINTERS IN NEWS

### 5. CHLOROPICRIN

#### SOURCE: INDIAN EXPRESS

Chloropicrin, also known as nitro chloroform, is a chemical compound used as both a warfare agent and pesticide.



- It appears as a colourless to yellow oily liquid and is extensively employed as a fungicide, herbicide, insecticide, nematicide, and antimicrobial.
- Originating from its use as a poison gas in World War I, it possesses tear-inducing characteristics similar to tear gas.
- The compound is manufactured through chemical reactions involving sodium hypochlorite (bleach) and nitromethane or by combining chloroform with nitric acid.
- Chloropicrin is highly toxic, carcinogenic, and can induce vomiting upon exposure via inhalation, ingestion, or skin contact.
- Recent accusations by the U.S. State Department accused Russia of using chloropicrin in Ukraine, violating the Chemical Weapons Convention.
- The Chemical Weapons Convention is a multilateral treaty banning chemical weapons and mandating their destruction within a specified timeframe.
- Entered into force on April 29, 1997, it requires states-parties to declare their chemical weapons stockpiles and production facilities.

- India, a signatory to the Convention since 1993, enacted the Chemical Weapons Convention Act, 2000, to comply with its provisions.
- The Convention aims to prevent the production, stockpiling, and use of chemical weapons, promoting global disarmament and peacekeeping efforts.

### 6. SCHENGEN VISA

#### SOURCE: HINDUSTHAN TIMES

The EU has relaxed its regulations to grant Indian nationals multiple-entry Schengen visas with extended validity.

Indians can now receive long-term, multi-entry Schengen visas valid for two years, provided they have obtained and used two visas within the past three years.



#### About Schengen Visas:

- **Purpose:** Necessary for non-Europeans to travel to all 29 countries in the Schengen area.
- **Schengen Area:** Comprises 29 countries, including 25 EU states (e.g., Belgium, Germany, Italy, France) and non-EU countries like Iceland, Liechtenstein, Norway, and Switzerland.
- **Movement:** Allows free movement within the Schengen zone for short visits up to 90 days within any 180-day period.
- **Employment:** These visas do not authorize employment.

#### Significance of the New Multiple Entry Visa System:

- **Easier Access:** Indian nationals can now obtain long-term, multi-entry Schengen visas valid for two years after having used two visas in the past three years.
- **Proven Travel History:** Available to those with a proven travel history and valid passports.
- **EU-India Collaboration:** Part of the EU-India Common Agenda on Migration and Mobility, aiming to enhance collaboration on migration policies.
- **People-to-People Connections:** Emphasizes enhancing connections between the EU and India, highlighting India's significance as an EU partner.



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## 7. ARAB LEAGUE

### SOURCE: HINDUSTHAN TIMES

At a recent Arab League Summit, the UN chief called for a Gaza ceasefire and regional unity.

### About the Arab League:

- Type: Intergovernmental organization.
- Region: Includes all Arab states in the Middle East and North Africa.
- Establishment: Founded in Cairo, Egypt, in 1945, following the 1944 Alexandria Protocol.
- Headquarters: Cairo, Egypt.

### Mandate:

- Strengthen relations and coordinate policies among member states.
- Cooperate on political, security, economic, and legal issues.

### Membership:

- Consists of 22 member states.
- India has observer status.



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## JAPAN'S DIPLOMATIC POSTURE

Japan's recent transformation from post-war pacifism to a more assertive military posture is reshaping regional dynamics in Asia and beyond.

This shift, driven by both external and internal factors, has significant implications for regional security, alliances, and economic cooperation.

### Key Facts About Japan's Diplomatic Posture

#### Japan's Diplomatic Journey Before World War II:

- **Seclusion (1600s-1850s):** Japan remained isolated from the world for over 200 years to preserve its social order and prevent foreign influence.
- **Catching Up (1850s-1900s):** Forced out of isolation by Western powers, Japan modernized its military and renegotiated treaties to regain control of its trade.
- **Aggressive Stance (1900s-1930s):** Frustrated by Western dominance, Japan pursued aggressive expansionism, leading to militaristic conquests and ultimately, World War II.

#### Japan's Diplomatic Journey After World War II:

- **Pacifism:** Following its defeat in World War II, Japan embraced a policy of pacifism, focusing on economic recovery and limiting military spending.
- **Economic Success:** Japan's economic success propelled it to become the world's second-largest economy by the 1970s.

### Factors Leading to Japan's Diplomatic Shift

#### External Factors:

- **China's Rise:** Japan's concerns over China's growing military power and territorial disputes in the East China Sea have prompted a reevaluation of its security posture.
- **North Korean Threat:** Continued nuclear and missile developments by North Korea have heightened security concerns for Japan.
- **Uncertain US Commitment:** Japan's perception of a waning US commitment to Asian security under the Trump administration has driven it to pursue greater self-reliance in defence.

#### Internal Factors:

- **Conservative Resurgence:** Growing conservative voices in Japan advocate for a more active security role and argue for Japan's responsibility to contribute to regional stability.
- **Pacifist Fatigue:** Decades of reliance on the US for security have led to questioning of the sustainability of Japan's pacifist stance.

### Japan's Changing Diplomatic Posture

#### Manifestations of Change:

- **Increased Defence Spending:** Japan has lifted the self-imposed cap on military spending, aiming to increase it to 2% of GDP by 2027.

- **Military Buildup:** Acquiring new military capabilities, including offensive weapons like cruise missiles, and easing restrictions on arms exports.
- **Deeper Security Cooperation:** Strengthening ties with allies like the US through joint military exercises and exploring joint defence projects.
- **Active Regional Diplomacy:** Enhancing relationships with regional powers like India and Australia to promote a free and open Indo-Pacific.

### How Japan's Changing Posture Will Affect Indian Interests Potential Benefits:

- **Countering China:** Japan's increased military capabilities and focus on the Indo-Pacific align with India's strategic interests in balancing Chinese influence.
- **Enhanced Security Cooperation:** Potential for increased joint military exercises, technology sharing, and relaxed export restrictions on Japanese defence equipment.
- **Infrastructure Development:** Japanese Official Development Assistance (ODA) loans could fund infrastructure projects in India's border areas, improving defence preparedness and connectivity.
- **Economic Cooperation:** Strengthened economic partnership could lead to increased trade and investment between India and Japan.

### Potential Challenges:

- **Competition:** The development of long-range strike capabilities by both India and Japan could lead to regional arms race and strain resources.
- **Diplomatic Challenges:** Balancing assertive powers in competing blocks like the Quad and BRICS may pose diplomatic challenges for India.
- **Ideological Conflicts:** Differences in stance on issues like human rights and nuclear proliferation could create ideological conflicts between India and Japan.

### Conclusion

Japan's diplomatic shift has far-reaching implications for Asia and the world, with potential benefits and challenges for India.

**Effective management of the relationship between India and Japan is crucial to harnessing the opportunities for increased security cooperation, economic partnership, while addressing challenges around competition, affordability, and strategic alignment.**

### MAINS QUESTION:

Q. "Discuss the factors driving Japan's recent transformation in diplomatic posture and analyze its implications for regional security and India's strategic interests." (150 WORDS)



## ECONOMY

### I. GROWTH AND DEVELOPMENT

#### 1. INEQUALITY CAN NO LONGER BE IGNORED

##### SOURCE: THE HINDU

Evidence from the World Inequality database reveals a significant rise in income and wealth inequality in India, with the top 1% experiencing their highest income share since 1922.

##### Need for Action:

- Inequality cannot be justified as a byproduct of growth.
- Cost of unequal growth must be examined.

##### Election Issue:

- Inequality becomes a significant election issue, welcomed regardless of outcome.
- Public discussion, especially on social media, focuses on direct redistribution measures.

##### Taxation and Spending:

- India's low tax-GDP ratio and regressive taxation structure underscore need for reform.
- Welfare spending remains inadequate compared to other countries, especially in health and social sectors.

##### Job Creation and Equitable Growth:

- Emphasis on generating decent jobs and equitable growth.
- Governments urged to invest in public services, cash transfer schemes, and direct job creation efforts.
- Focus on improving quality of jobs, especially for women, and reducing inequality in opportunities.

##### Factors Contributing to Income Inequality:

- **Wage Disparities:** Differences in wages across occupations and industries create income gaps.
- **Educational Disparities:** Higher education levels often lead to better-paying jobs, widening income discrepancies.
- **Technological Changes:** Advancements in technology affect demand for skills, impacting income distribution.
- **Globalization:** Global economic integration can lead to job outsourcing and wage pressure, exacerbating inequality.
- **Labor Market Trends:** Shifts towards gig economy jobs and part-time work influence income distribution.

- **Tax Policies:** Tax structures can either reduce or worsen income inequality, with progressive taxes helping to narrow the gap.

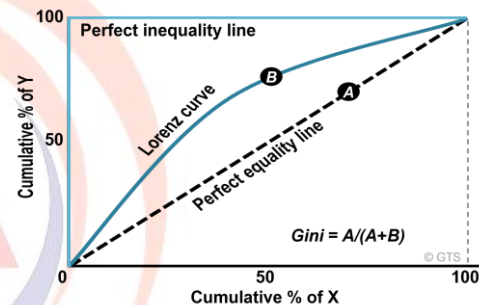
##### Measuring Income Inequality:

##### Gini Coefficient:

- Calculates income inequality by comparing the distribution of income among individuals or households.
- Ranges from 0 (perfect equality) to 1 (perfect inequality).
- A higher coefficient indicates greater income inequality.

##### Lorenz Curve:

- Graphically represents income distribution by plotting cumulative income shares against the population.
- Shows the gap between actual income distribution and perfect equality.
- Greater deviation from the line of perfect equality signifies higher income inequality.



##### Atkinson Index:

- Measures inequality by assigning different weights to income differences across the distribution.
- Reflects societal preferences regarding inequality aversion.
- Sensitive to changes in income distribution among different income groups.

##### Mains Question:

Q. Examine the factors contributing to rising income inequality in India and evaluate policy measures to address this issue, considering its implications for social and economic development. (150 WORDS)

### II. BANKING AND FINANCIAL INTERMEDIARIES

#### 2. NPCI'S GLOBAL ARM TO DEVELOP UPI-LIKE SYSTEM FOR NAMIBIA

##### SOURCE: THE HINDU

India's National Payments Corporation of India (NPCI) is helping Namibia develop a modern payment system. NPCI's international arm signed a deal with the Bank of Namibia to create an instant payment system similar to India's UPI.



- This will allow Namibia to upgrade its financial infrastructure and potentially improve accessibility for its citizens.

#### Unified Payments Interface (UPI):

- **The UPI is a digital payment method launched in India in 2016.**
- Developed by the National Payments Corporation of India (NPCI) and regulated by the Reserve Bank of India (RBI), it allows for quick and easy money transfers between bank accounts.

#### Making Payments a Breeze:

- **Goodbye Account Numbers:** Forget complex bank details! UPI uses simpler identifiers like a mobile number, QR code, or Virtual Payment Address (VPA) to send money.
- **Security at Your Fingertips:** No need to remember multiple passwords for different apps. UPI uses a single, secure PIN for all transactions, offering 24/7 accessibility.
- **Seamless Transactions:** UPI acts as a neutral platform, ensuring smooth interactions between banks, merchants, and customers. There are also no transaction fees for users.

#### More than Just Transfers:

- **Flexibility for All:** UPI goes beyond basic transfers. It facilitates both sending (push) and receiving (pull) payments.
- **Offline Transactions:** Need to pay at a store? UPI works for in-person payments using QR codes or barcodes.
- **Recurring Payments Made Easy:** Schedule and pay regular bills, subscriptions, or fees conveniently through UPI.
- **Person-to-Person Requests:** Easily request money from friends or family, allowing them to pay at their convenience.

#### Underlying Technology:

- UPI leverages existing infrastructures like Immediate Payment Service (IMPS) and Aadhaar-enabled Payment System (AEPS) to ensure smooth and secure money transfers between accounts.

#### The National Payments Corporation of India (NPCI): Powering India's Retail Payments

The National Payments Corporation of India (NPCI) is a key player in India's financial landscape. Established in 2008, it functions as an umbrella organization overseeing retail payment and settlement systems across the country.

#### A Collaborative Effort:

- **Born out of a joint initiative by the Reserve Bank of India (RBI) and the Indian Banks' Association (IBA),** NPCI's creation was authorized by the Payment and Settlement Systems Act of 2007.
- This act aimed to build a robust infrastructure for payments and settlements within India.

#### Strong Foundations:

- **NPCI is a not-for-profit company with ten major promoter banks,** including industry giants like State Bank of India, Punjab National Bank, and ICICI Bank.
- Its objective is to provide the entire Indian banking system with the infrastructure needed for efficient electronic and physical payment processing.

#### Innovation at the Core:

- NPCI prioritizes driving innovation in retail payment systems. **By leveraging technology, they strive to streamline operations and expand the reach of payment options for all Indians.**

#### Challenges to Address:

- **Cybersecurity Concerns:** The global surge in cybercrime poses a threat to the banking and financial services industry, including UPI. Examples include malware like Cerberus targeting vulnerabilities.
- **Fraudulent Activities:** Issues like fraudulent claims, chargebacks, fake accounts, and promotion abuse necessitate robust security measures.
- **Account Takeover and Identity Theft:** Protecting user accounts and data from unauthorized access remains crucial.
- **Payment Card Frauds:** UPI needs to stay vigilant against card detail theft and triangulation frauds, where stolen card information is used for fraudulent transactions.

#### Additional Negatives to Consider:

- **Limited Reach:** While growing, UPI penetration in rural areas might still lag behind urban centers.
- **Reliance on Internet Connectivity:** Transactions require a stable internet connection, potentially excluding users with limited access.
- **Digital Literacy Gap:** Bridging the digital literacy gap is essential to ensure everyone can benefit from UPI.

### III. INFLATION

#### 3. US FED KEEPS INTEREST RATES AT 23-YEAR HIGH AMID STUBBORN INFLATION.

#### SOURCE: TIMES OF INDIA

The recent announcement by the US Federal Reserve to keep its benchmark rate unchanged due to an uptick in inflation has significant implications for global markets, including emerging economies like India.

Understanding the impact of the Federal Reserve's monetary policy decisions is crucial for analyzing borrowing costs, economic growth prospects, currency markets, and central bank policies worldwide.

#### Inflation in the US

- The consumer price index in the US increased by 0.4 per cent month-on-month and surged 3.5 per cent year-on-year, according to data released by the US Labour Department's Bureau of Labour Statistics.
- The US Fed Chair stated that inflation remains high, and rate cuts would not be considered until price growth starts moving down towards its 2 per cent target.
- The Chairman highlighted the uncertainty surrounding future progress in reducing inflation, indicating cautiousness in monetary policy decisions.

### Importance of US Fed Signals

#### Monetary Policy and Its Impact

- The US Federal Reserve, similar to other central banks like the RBI, conducts monetary policy to influence employment and inflation levels.
- **Monetary policy tools are utilized to regulate the availability and cost of credit in the economy, with the federal funds rate being the primary tool.**
- Changes in interest rates impact borrowing costs for households and businesses, influencing spending, investment, employment levels, and inflation rates.

#### Impact on Borrowing Costs

- **Lower interest rates make borrowing cheaper for households and businesses**, encouraging increased spending and investment.
- Reduced borrowing costs stimulate economic activity, contributing to growth in consumption, investment, and overall economic output.

#### Impact on Growth Cycle

- Monetary policy affects the growth cycle by influencing demand for goods and services, which in turn impacts wages and economic expansion.
- **While the linkages between monetary policy, inflation, and employment are not direct, monetary policy plays a crucial role in managing inflationary pressures and sustaining economic growth momentum.**

#### Significance for Emerging Market Economies

- A signal to cut policy rates in the US can be beneficial for emerging market economies, particularly from a debt market perspective.
- **Emerging economies like India, with higher inflation and interest rates, may attract capital inflows** as investors seek higher returns compared to developed countries.

#### Impact on Other Markets, Including India

##### Currency Carry Trade Opportunity

- **A rate cut by the US Federal Reserve could widen the interest rate differential between the US and**

**other countries, making countries like India more appealing for currency carry trade.**

- Currency carry trade involves borrowing funds in a currency with a lower interest rate to invest in a currency with a higher interest rate, aiming to profit from the interest rate differential.

#### Boost to US Growth and Impact on Global Economic Scenario

- Lower rates signal a push for growth in the US economy, which can have positive spillover effects on global economic expansion.
- **Reduced returns in US debt markets may prompt investors to shift towards emerging market equities, boosting foreign investor sentiment.**

#### Impact on Currency Markets

- Inflows of funds driven by lower US rates can influence currency markets, leading to changes in currency valuations and impacting global trade dynamics and financial markets.

#### Decisions of Central Banks of Other Countries

- Central banks of other countries, including the Reserve Bank of India (RBI), may adjust their monetary policies in response to changes in global economic conditions and interest rate trends set by major central banks like the Federal Reserve.

## IV. AGRICULTURE AND ALLIED

### 4. SWEET SORGHUM

#### SOURCE: INDIAN EXPRESS

**Sweet sorghum, a resilient and nutritious biofuel crop, presents a viable solution for drought-stricken regions in southern Africa, particularly in light of the El-Nino phenomenon.**



#### About Sweet sorghum:

- **Significance:** Important millet crop, second to rice in cereal crop area.
- **Key Characteristic:** Drought resistance can enter dormancy during dry periods and resume growth later.

#### Climatic and Soil Requirements:

- **Rainfall:** Prefers low to moderate rainfall; high soil moisture or heavy rain post-flowering can hinder sugar production.





- **Soil:** Suited to medium-depth soils with good drainage, including red, black, laterite, and loamy soils.
- **Water Requirement:** Varies based on soil type and depth.

### Unique Features:

- **Resilience:** Withstands low water, low nitrogen inputs, salinity, and drought stress, ideal for arid regions.
- **Adaptation:** Uses stalk juice to supplement water needs under extreme water scarcity.

### Uses:

- **Food Industry:** Grains used for steamed bread, porridge malt, and beer production (traditional and commercial).
- **Value-Added Products:** Stalk used to produce ethanol, syrup, jaggery, and bio enriched bagasse for fodder and cogeneration.

### Benefits:

- **Versatility:** Produces grains, animal feed, and sugary juice.
- **Nutritional Value:** Nutritious crop providing food security and biofuel solutions.

## V. TRADE AND EXTERNAL SECTOR

### 5. INDIA'S CHINESE IMPORT BILL UP 2.3 TIMES IN 15 YEARS

#### SOURCE: THE HINDU

India's imports from China surged to over \$101 billion in 2023-24 from around \$70 billion in 2018-19. China's share of India's industrial goods imports increased from 21% to 30% over 15 years.

- Report by the Global Trade Research Initiative (GTRI) anticipates further growth in Chinese imports.

#### Sectoral Dominance:

- **China emerges as the top supplier in eight major industrial sectors**, including machinery, chemicals, pharmaceuticals, and textiles.
- Chinese imports extend beyond electronics to various industries. **Major industrial product imports into India reached 30%, with over 70% in some categories.**
- Significant reliance on Chinese imports observed across various sectors, including textiles, machinery, electronics, and chemicals.

#### Trade Deficit Concerns:

- **India faces a growing trade deficit with China**, with stagnant exports and surging imports.
- **Cumulative trade deficit exceeds \$387 billion** over six years, raising economic concerns.

#### Export Scenario:

- **While exports to China increased in 90 principal commodities**, India's overall trade balance remains skewed.
- **Exports to China include items like iron ore, telecom instruments, and electronic components.**

#### TRADE DEFICIT

A trade deficit occurs when a country import more in value of goods and services than it exports. In simpler terms, a country is buying more from other countries than it is selling to them. This results in a negative balance of trade.

- **India has the largest trade deficit with China.**
- **Electronics and fossil fuels are greatest contributing sectors of trade deficit**



#### How Atmanirbhar Bharat can make India self-reliant

The Atmanirbhar Bharat Abhiyan (Self-reliant India Mission) aims to boost domestic manufacturing and reduce import dependence.

#### Possible Positive Impacts:

- **Production Growth:** There has been a rise in production of some goods like mobile phones. India became the world's second-largest mobile phone producer in 2021.
- **Foreign Direct Investment (FDI):** FDI inflows into certain sectors like manufacturing have increased since the initiative's launch. This indicates growing investor confidence in domestic production.

#### Challenges and Debates:

- **Overall Import Reduction:** While there might be a shift in sources (diversifying away from China), overall import dependency hasn't significantly decreased yet according to some
- **Impact on Consumers:** Increased focus on domestic production can lead to higher prices for consumers initially, especially if domestic alternatives haven't yet reached economies of scale.
- **Technological Upgradation:** Can India's industries become globally competitive in quality and innovation?
- **Ease of Doing Business:** Does India provide a conducive environment for manufacturers to operate efficiently?

#### Government tackles import concerns through initiatives:

- **PLI Scheme:** Offers incentives for domestic manufacturing in key sectors, reducing reliance on imports.
- **Boosting Bulk Drug Production:** Programs promote domestic API production, reducing dependence on foreign medicines.





- **Focus on Specific Sectors:** Support for sectors like textiles and electronics to become import substitutes and global exporters.
- **Technical Regulations:** Stricter standards for products like electronics to ensure quality and competitiveness of domestic manufacturing.
- **E-20 Ethanol blending program aims to blend ethanol with petrol**, to decrease bimport burden on fossil fuels
- **Biofuels Mission:** Promoting biofuel production like ethanol from sugarcane can partially substitute for imported gasoline, reducing dependence on crude oil.

**Dependency on Chinese imports has profound economic and national security implications. Calls for reassessment of India's import strategies to mitigate economic risks, bolster domestic industries, and reduce dependency on single-country imports.**

### Mains Question:

Q. Discuss the implications of India's growing trade deficit with China and the strategies outlined under the Atmanirbhar Bharat initiative to address import dependency and promote domestic manufacturing. (150 WORDS)

## 6. THE SERVICES STORY

### SOURCE: THE HINDU

The Goldman Sachs report emphasizes India's outpacing of the global average in services exports, underscoring the nation's burgeoning success in the global services sector.

### Services Export Growth

- Professional consulting experienced fastest growth.
- Travel services showed slowest growth.
- Financial services poised to grow with initiatives like GIFT City.

### Export Growth Trends

- Intangible exports from India grew twice as fast as global average.
- **India's services outflows increased from under 2% in 2005 to 4.6% in 2023.**
- Goods exports share increased from 1% to 1.8% during the same period.

### Impact on External Balances

- Services trade boom cushioned against shocks like expensive oil imports.
- **Services exports projected to reach \$800 billion by 2030, slightly below government's \$1 trillion target.**

### Immediate Outlook

- IT services, India's dominant export, facing uncertainties with some firms shedding employees.
- **Growth guidance for the year not very optimistic.**

### Challenges and Constraints

- **Need for job-ready graduates and resource management.**
- Protectionist measures in destination countries and domestic policy interventions could hinder growth.

### The top 5 export commodities from India are:

- Petroleum Products
- Pearl, Precious, Semiprecious Stones
- Drug Formulations, Biologicals
- Gold and Other Precious Metal Jewellery
- Iron and Steel

### The top 5 countries to which India exports the most are:

- United States of America (USA)
- United Arab Emirates (UAE)
- China (People's Republic of China)
- Hong Kong
- Singapore

### The top 5 countries from which India imports the most are:

- China (People's Republic of China)
- United States of America (USA)
- United Arab Emirates (UAE)
- Saudi Arabia
- Iraq

## VI. PRELIMS POINTERS IN NEWS

### 7. ASSET RECONSTRUCTION COMPANIES

### SOURCE: TIMES OF INDIA

Recently RBI has released guidelines for asset reconstruction companies.

### Asset Reconstruction Companies (ARCs):

- **ARCs are specialized financial institutions that buy bad debts from banks at agreed-upon values and work to recover them.**
- They are registered under the RBI and regulated by the SARFAESI Act, 2002.
- **ARCs operate under RBI's supervision and control.**
- Functions include acquiring financial assets, changing management, rescheduling debts, enforcing security interest, and settling dues.
- They take over NPAs from banks, engaging in asset reconstruction or securitization.
- **All rights regarding the debt transfer from the bank to the ARC.**

**Funding:** Funds for purchasing debts come from Qualified Buyers, including financial institutions, insurance companies, banks, and others.

- **Only Qualified Buyers can provide funds to ARCs.**
- **ARCs play a crucial role in managing distressed assets and aiding banks in resolving their NPAs.**

## 8. NBFCs RAISE FIXED DEPOSIT RATES

SOURCE: INDIAN EXPRESS

NBFCs are raising their fixed deposit (FD) rates to gather funds, compensating for reduced bank borrowings.



### About NBFCs:

Non-Banking Financial Companies (NBFCs) are registered companies involved in various financial activities like lending, investment, leasing, and insurance, but they don't have a banking license.

- **Scope of Activities:** NBFCs engage in diverse financial services such as providing loans, buying stocks, bonds, or securities, leasing assets, and offering insurance and chit fund services. However, they can't deal with activities like agriculture, industrial work, or real estate transactions.
- **Deposit Taking:** While NBFCs can't accept traditional demand deposits like banks, they can accept fixed deposits (FDs) from the public for a specific period, typically ranging from 12 to 60 months.
- **Interest Rates:** NBFCs cannot offer interest rates higher than the ceiling rate set by the Reserve Bank of India (RBI), which presently stands at 12.5% per annum.
- **Regulatory Oversight:** Both the Ministry of Corporate Affairs and the RBI regulate NBFCs. The RBI issues licenses, monitors operations, and ensures compliance with regulations to safeguard financial stability.
- **Systemically Important NBFCs:** NBFCs with assets worth ₹500 crore or more are classified as systemically important. This classification is because their operations can significantly impact the overall economy's financial stability.
- **Examples:** NBFCs include a wide range of institutions such as investment banks, mortgage lenders, insurance companies, hedge funds, and peer-to-peer (P2P) lenders. These entities play crucial roles in the financial sector by providing diverse financial services.

## GS-MENTORSHIP

### UPSC CSE 2025



- STRATEGIC DAILY PLANNER (ACCORDING TO SYLLABUS)
- PERSONALISED INTERACTION
- SOURCE TRACKING IN PRECISE
- TIPS & TRICKS WITH MNEMONICS
- 360-DEGREE APPROACH
- WEEKLY TESTS WITH EXPLANATION (PRELIMS & MAINS)
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## STATE OF EMPLOYMENT IN INDIA

India has witnessed a significant surge in employment over recent years, generating over 80 million additional jobs between 2017-18 and 2022-23.

This rapid growth has sparked discussions about its underlying causes and the sustainability of this trend.

### Key Trends in Employment Growth:

- **Historical Growth:** Analysis of NSSO data from 1983 to 2023 reveals consistent growth in principal employment across all sub-periods.
- **Consistent Growth:** Principal employment, indicating those working for the bulk of the year, has steadily increased since 1983, with no instances of jobless growth.
- **Significant Increase (2017-2023):** The period from 2017-18 to 2022-23 witnessed the fastest increase, adding about 80 million jobs at an annual growth rate of 3.3%.
- **Labour Market Indicators:** Recent years have seen improvements in key labour market indicators like the labour force participation rate, workforce participation rate, and unemployment rate, despite long-term deterioration since 2000.

### Employment Quality:

- **Rise in Informal Employment:** Approximately 50% of formal sector jobs are informal, with around 82% of the workforce engaged in the informal sector.
- **Dominance of Self-Employment:** A substantial portion of employment growth is in the form of own-account workers and unpaid family workers, constituting 55.8% of total employment in 2022.
- **Wage Trends:** Aggregate wages and salaries have shown relative stagnation, with average annual growth at 6.6% in nominal terms but only 1.2% after adjusting for inflation.

### Trends in Youth Employment:

- **Increase in Youth Employment:** Youth employment and underemployment rose between 2000 and 2019 but declined during the pandemic years.
- **Unemployment Among Educated Youths:** The unemployment rate among educated youths has intensified over time, particularly among those with secondary education or higher.

### Concerns Regarding Employment in India:

- **Growth of Informal Sector:** Many new jobs are informal, lacking security, benefits, or minimum wage, leading to concerns about job quality.
- **Quality of Jobs for Youth:** Youth employment often lacks quality, with many young people over-educated for available jobs or stuck in precarious situations like the gig economy.
- **Gender Gap:** Women's participation in the workforce remains low, with many ending up in

unpaid family work or low-paying self-employment instead of formal jobs.

- **Skill Mismatch:** The education system may not align with current job market needs, resulting in a skill mismatch.
- **Formalisation Challenges:** A significant portion of the workforce remains in the informal sector, posing challenges for formalisation and social security.
- **Job Automation:** Automation threatens certain sectors, potentially leading to job displacement, particularly in industries like manufacturing.
- **Vulnerability to Economic Shocks:** Informal and casual workers are highly vulnerable to economic downturns, as seen during the Covid-19 pandemic.
- **High Demand for Government Jobs:** Limited job creation in the private sector has led to a significant demand for government jobs.

### Government Initiatives Related to Employment:

1. Support for Livelihood and Enterprise (SMILE)
2. Pradhan Mantri Dakshta Aur Kushalta Sampann Hitgrahi (PM-DAKSH)
3. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)
4. Pradhan Mantri Kaushal Vikas Yojana (PMKVY)
5. Start-Up India Scheme
6. Rozgar Mela
7. Indira Gandhi Urban Employment Guarantee Scheme- Rajasthan
8. Direct Benefit Transfer Scheme
9. Pradhan Mantri Mudra Yojana

### Way Forward:

- **Promote Formalisation:** Incentivise informal workers to transition to the formal sector, streamline registration processes for small businesses, and draw on successful international models like Peru's National Strategy.
- **Targeted Programs for Marginalised Groups:** Implement more targeted skill development programs for individuals from marginalised communities, ensuring inclusivity and active participation in the workforce.
- **AI and Automation Reskilling:** Prepare the workforce for automation by providing training programs in areas like AI, robotics, and data science to adapt to evolving job market needs.
- **Social Security Portability:** Design a portable social security system catering to the needs of gig workers and those transitioning between formal and informal sectors.
- **Entrepreneurship and Innovation:** Establish industry-specific startup support mechanisms and

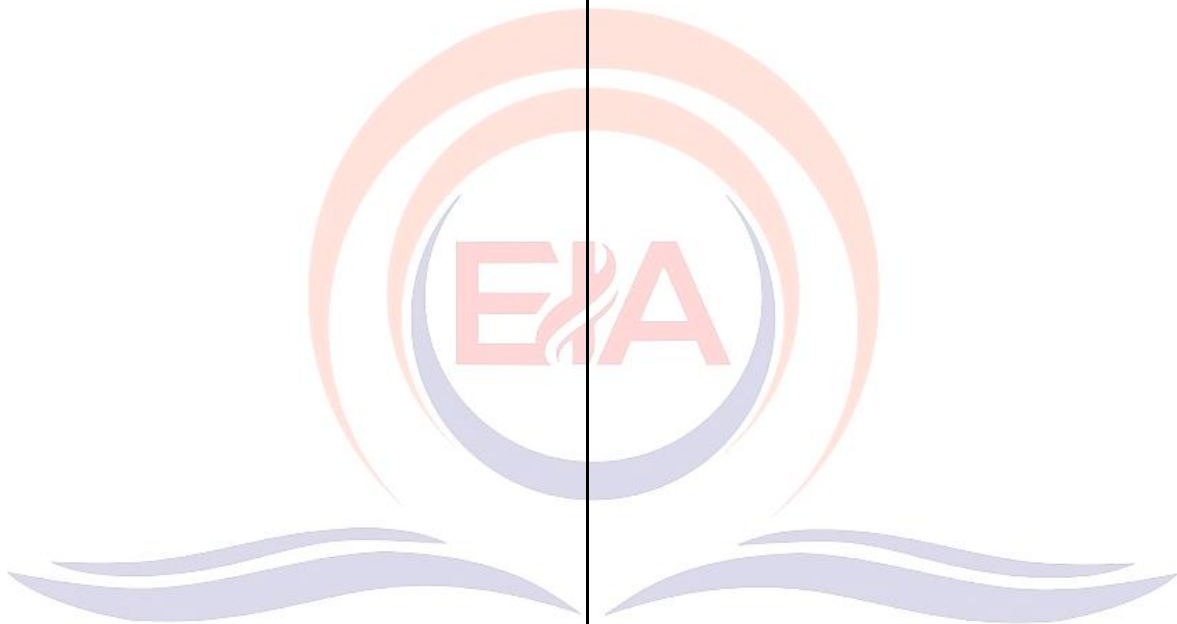


encourage angel investor networks to foster entrepreneurship and innovation.

- **Remote Work Opportunities:** Encourage companies to offer remote work arrangements, expanding job opportunities and promoting a better work-life balance.

## UPSC MAINS QUESTION

Q. "Discuss the recent trends in employment growth in India and highlight the key concerns and government initiatives aimed at addressing the challenges in the labour market."  
(150 WORDS)





## GEOGRAPHY

### I. GEOLOGICAL PHENOMENON

#### 1. LA CUMBRE VOLCANO

**SOURCE: LIVESCIENCE**

La Cumbre volcano, situated on Fernandina Island in the Galápagos Islands, recently erupted, causing destruction to the habitat of rare Galápagos land iguanas.



**About La Cumbre volcano:**

- Fernandina Island is the third largest island in the Galápagos archipelago, located about 1,125 kilometers off the coast of mainland Ecuador.
- **La Cumbre volcano lies directly above the mantle plume responsible for the formation of all the Galápagos Islands and erupted for the first time since 2020.**
- The volcano features a large crater, or caldera, at its summit, which houses a permanent crater lake attracting various animals, including tens of thousands of Galápagos land iguanas.
- **Galápagos land iguanas, such as the Conolophus subcristatus species, are one of three land iguana species endemic to the Galápagos Islands.**
- These large lizards, primarily herbivores, have a symbiotic relationship with finches, who help clean them of ticks.
- **Galápagos land iguanas are active during the day, foraging and basking in the sun, and sleep in burrows at night.**
- Despite their unique adaptations, Galápagos land iguanas are classified as Vulnerable by the IUCN due to various threats.

#### 2. CATATUMBO LIGHTNING

**SOURCE: FINANCIAL EXPRESS**

Catatumbo Lightning is a captivating natural spectacle that occurs over the Catatumbo River in Venezuela, where lightning strikes almost incessantly. This phenomenon primarily unfolds at the convergence of the Catatumbo River and Lake Maracaibo, Venezuela's largest lake.



**Formation Process:**

- **Catatumbo Lightning** arises from a convergence of atmospheric conditions.
- Warm, moist air from the Caribbean Sea clashes with cooler air descending from the Andes mountains.
- **This collision triggers rapid upward movement of the warmer air**, leading to its cooling and condensation into towering cumulonimbus clouds.
- Concurrently, **strong winds and temperature variations generate electrical charges within these clouds.**

**Unique Characteristics:**

- **The cumulonimbus clouds, often exceeding 5 km in height**, accumulate static electricity. When the electrical potential reaches a critical level, it discharges in the form of lightning.
- Catatumbo Lightning is renowned for its frequency and persistence, **with lightning strikes occurring for about 160 nights annually, averaging 28 strikes per minute at its peak.**
- Consequently, the region has gained recognition as **"the lightning capital of the world."**

**About Lake Maracaibo:**

- Lake Maracaibo, situated in Venezuela, is the **largest lake in Latin America and one of the oldest water bodies globally.**
- Its geographical proximity to the Andes Mountains and the Caribbean Sea plays a pivotal role in fostering the unique atmospheric conditions conducive to the frequent occurrence of lightning in the region.

#### 3. BATAGAY CRATER

**SOURCE: INDIAN EXPRESS**

The Batagay Crater, also known as the "gateway to the underworld," is a significant feature in Russia's Far East, located in the Sakha Republic. It's recognized as the world's largest permafrost crater.



- **Discovery:** The crater, or megaslump, was first identified in 1991 through satellite images after a section of the hillside collapsed in the Yana Uplands of northern Yakutia, Russia.
- **Formation:** Scientists attribute the crater's formation to the melting of permafrost, which has been frozen since the Quaternary Ice Age around 2.58 million years ago.
- **Permafrost:** Permafrost refers to ground that remains continuously frozen at or below 32°F (0°C) for at least two consecutive years.

#### Global Distribution:

- **Permafrost is predominantly found in regions with high mountains and in Earth's higher latitudes, particularly near the North and South Poles.**
- It covers substantial areas of the Earth, with almost a quarter of the land area in the Northern Hemisphere having permafrost underneath.

#### Impacts of Melting:

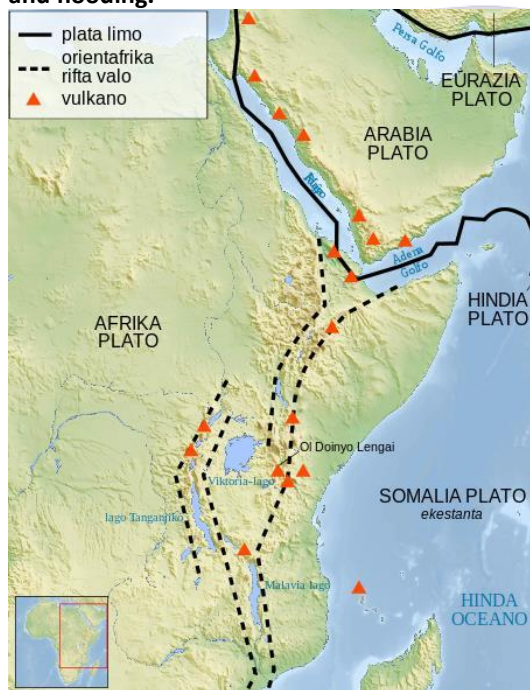
- The growing Batagay Crater highlights the consequences of permafrost thawing, which can lead to land subsidence, release of greenhouse gases like methane, and disruptions to infrastructure and ecosystems.

## II. PRELIMS POINTERS IN NEWS

### 4. THE GREAT RIFT VALLEY

#### SOURCE: DOWN TOO EARTH

At least 42 individuals lost their lives in Kenya's Rift Valley due to a dam bursting its banks, aggravated by heavy rains and flooding.



#### About Great Rift Valley

- **The Great Rift Valley is one of the largest rifts on Earth's surface, spanning approximately 4,000 miles from Jordan to central Mozambique along East Africa.**
- It traverses multiple countries, including Eritrea, Djibouti, Ethiopia, Kenya, Tanzania, Uganda, Rwanda, Burundi, the Democratic Republic of the Congo (DRC), Malawi, Zambia, and Mozambique.
- **The Great Rift Valley is part of the East African Rift System (EARS), a larger geological feature.**
- It formed around 40 million years ago when tectonic plates shifted, giving rise to the East African Rift.
- **The valley averages 30 to 40 miles in width but widens to nearly 300 miles in the Danakil Desert.**
- Its steep walls rise approximately 3,000 feet above the valley floor, reaching heights of up to 9,000 feet in some areas.
- **The region is geologically active, featuring volcanoes, hot springs, geysers, and frequent earthquakes.**
- Along the Rift Valley's length lie approximately thirty lakes, including the Great Lakes of Africa such as Lake Tanganyika and Lake Victoria.
- **Rift valleys form when Earth's tectonic plates move apart, creating lowland regions, unlike river valleys and glacial valleys, which result from erosion processes.**

### 5. SHAKSGAM VALLEY

#### SOURCE: BUSINESS STANDARD

India has strongly protested China's construction activities in the Shaxsgam Valley, considering them illegal attempts to alter the ground situation.



- **Location:** The Shaxsgam Valley, also known as the Trans Karakoram Tract, is situated in the Hunza-Gilgit region of Pakistan-Occupied Kashmir (POK). It is a disputed territory claimed by India but controlled by Pakistan.
- **Borders:** The valley shares its borders with Xinjiang Province of the People's Republic of China (PRC) to the north, the Northern Areas of POK to the south





and west, and the Siachen Glacier region to the east.

- **Cession to China:** In 1963, Pakistan ceded the Shaksgam Valley to China when both nations signed a boundary agreement to settle their border disputes.
  - However, **Article 6 of the agreement stipulated that the sovereign authority concerned would reopen negotiations with China after the resolution of the Kashmir dispute between Pakistan and India.**
- **Karakoram Highway:** The agreement also set the groundwork for the development of the Karakoram Highway, a project that saw collaboration between engineers from China and Pakistan during the 1970s.

## 6. KANWAR LAKE

### SOURCE: DOWN TO EARTH

Kanwar lake is Asia's largest freshwater oxbow lake situated in Bihar, also known as Kabartal jheel.

- **Formation:** Resulted from the meandering of the Gandak river, a tributary of the Ganga, covering a significant portion of northern Bihar's Indo-Gangetic plains.
- **Importance:** A vital stopover along the Central Asian Flyway for migratory waterbirds, hosting 58 species for resting and refueling.
- **Biodiversity:** Home to over 50 fish species, including five critically endangered species like three types of vultures and two waterbirds.

### Threats:

- **Water Management:** Activities such as drainage, water abstraction, damming, and canalization pose significant threats.

### Oxbow Lake:

- **Definition:** A curved lake formed alongside a winding river due to erosion and sediment deposition.



- **Appearance:** Typically crescent-shaped, found in floodplains and low-lying areas near rivers.
- **Current Condition:** Facing survival challenges due to human interventions and ecological disturbances.

- **Conservation Importance:** Efforts needed to protect and restore the lake's ecological balance to maintain its significance as a crucial habitat for migratory birds and fish biodiversity.
- **Community Awareness:** Increasing awareness among locals and stakeholders about the lake's ecological importance and the need for sustainable management practices.



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## NOAA PREDICTS UP TO 13 HURRICANES FOR UPCOMING SEASON

Wind shear is a significant meteorological phenomenon that influences the development and intensity of hurricanes. Understanding wind shear and its effects is crucial for predicting storm behaviour and preparing for potential impacts.

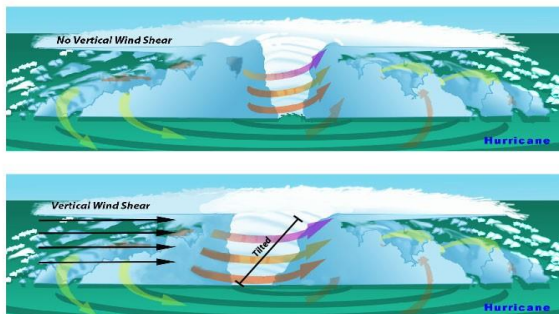
### What is Wind Shear?

Wind shear refers to a sudden change in wind speed and/or direction over a relatively short distance.

### Types:

- **Vertical Wind Shear:** Changes in wind speed and/or direction with increasing altitude. Examples include **low-level jet streams and wind shear within thunderstorms.**
- **Horizontal Wind Shear:** Changes in wind speed and/or direction over a horizontal distance. Examples include **frontal systems and sea breezes.**

Effects of Vertical Wind Shear on Hurricanes



### Major Causes of Wind Shear

- **Temperature Inversion:** Occurs when warm air near the ground traps cooler air above, creating strong vertical wind shear. **This can be hazardous for aircraft during takeoff and landing.**
- **Thunderstorms:** Powerful updrafts and downdrafts cause both horizontal and vertical wind shear, making flying near thunderstorms dangerous.
- **Frontal Systems:** These are boundaries between warm and cold air masses (fronts) that cause quick changes in wind speed and direction, leading to horizontal wind shear.

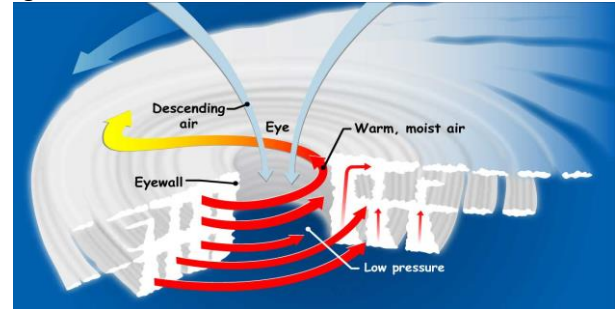
### Detection Methods

- **Low-Level Wind Shear Alert System (LLWAS):** A network of ground-based towers using anemometers and wind direction sensors to measure wind speed and direction at multiple points around an airport.
- **Doppler Radar:** Tracks wind speed and direction from the ground to detect wind shear zones.
- **LIDAR:** Uses light to detect wind shear, especially helpful for identifying clear air turbulence.

### Hurricanes

Hurricanes, also known as tropical cyclones, are violent storms originating over oceans in tropical areas, causing

destruction through violent winds, heavy rainfall, and storm surges.



### Names in Different Regions:

- **Typhoons** in the China Sea and Pacific Ocean
- **Tornadoes** in West Africa and Southern USA
- **Willy-willies** in north-western Australia
- **Tropical Cyclones** in the Indian Ocean
- **Hurricanes** in the West Indian islands in the Caribbean Sea and Atlantic Ocean

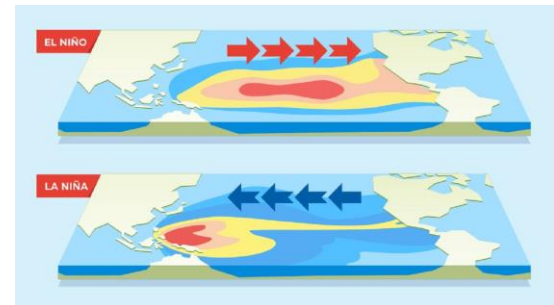
### Effects of Wind Shear on Hurricanes

- **Minimal Vertical Wind Shear:** Favors hurricane development by allowing a symmetrical structure and efficient rotation.
- **Strong Vertical Wind Shear:** Disrupts the hurricane's vertical structure, offsetting the top of the storm from the bottom. This weakens the wind circulation, heat transport, and moisture supply, which are essential for fueling the hurricane.
- **Excessive Vertical Wind Shear:** Can potentially tear a hurricane apart, preventing it from intensifying.

### Other Factors Affecting Hurricane Intensity

- **Sea Surface Temperatures:** Warm sea surface temperatures provide the energy needed for hurricanes to develop and strengthen.
- **Atmospheric Moisture Content:** High moisture levels in the atmosphere contribute to the development and intensification of hurricanes.
- **Pressure Systems:** Low-pressure systems can aid in the formation and strengthening of hurricanes.

### Influence of El Nino and La Nina on Wind Shear



### El Nino's Influence:

- **Characterized by warmer sea surface temperatures** in the eastern Pacific Ocean and cooler temperatures in the western Pacific.





- Leads to stronger upper-level winds over the Atlantic during hurricane season, resulting in increased vertical wind shear.
- **Makes it more challenging for hurricanes to develop and intensify in the Atlantic basin.**

#### La Nina's Influence:

- **Characterized by cooler sea surface temperatures in the eastern Pacific** and warmer temperatures in the western Pacific.
- Results in weaker vertical wind shear over the Atlantic, allowing for more active hurricane seasons.
- **The record-breaking 2020 Atlantic hurricane season occurred during a La Nina event.**

#### UPSC MAINS QUESTION

Q. Discuss the impact of wind shear on the development and intensity of hurricanes, considering the influences of phenomena such as El Niño and La Niña. (150 WORDS)

## HISTORY

### I. ANCIENT HISTORY

#### 1. CHAKISAURUS NEKUL

##### SOURCE: REUTERS

Chakisaurus nekul's name comes from the indigenous languages of the region. "Chaki" means "old guanaco" in the Aonikenk language of the Tehuelche people, while "nekul" means "fast" or "agile" in the Mapudungún language of the Mapuche people.



**Habitat and Time:** This dinosaur lived approximately 90 million years ago during the Late Cretaceous period in what is now Patagonia, Argentina.

**Discovery Location:** It was found in the Pueblo Blanco Natural Reserve in the southern province of Río Negro, Patagonia. This area is known for its abundant fossil discoveries, including mammals, turtles, fish, and other dinosaur species.

##### Characteristics:

- Medium-sized herbivore.
- Known for its speed; it was a fast runner.
- Its tail curved downward, unlike most other dinosaurs whose tails were horizontal.
- It walked on two legs, making it bipedal.

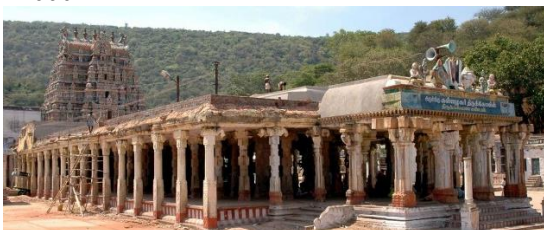
**Significance of Findings:** Studies of Chakisaurus provided new insights into its behaviour, highlighting its speed and the unusual curvature of its tail.

### II. PRELIMS POINTERS IN NEWS

#### 2. ALAGAR TEMPLE IN MADURAI

##### SOURCE: MINT

The procession of Lord Kallalagar from Alagar hills to Vaigai river is a significant part of the Chithirai festival in Madurai, Tamil Nadu.



##### About Alagar Temple (Azhagar Kovil):

- **Location:** Situated at the foothills of Alagar hills, it's dedicated to Lord Vishnu and is renowned for its intricate sculptures and mandapams.
- **Historical Significance:** Mentioned in ancient epics like Silappathikaram, and revered by Alvars (saints) including Thirumangai Alvar, Nammalvar, and Andal.
- **Inscriptions and Residences:** Inscriptions dating back to King Ashoka's rule are found here. The temple is said to have been visited by the Jain monk Ajjanandi and his disciples.
- **Pandyan Reign:** Held prominence during the Pandyan reign, with contributions such as beautification of the sanctum sanctorum's vimana with gold plates and construction of the massive entrance tower.
- **Nayaka Dynasty:** King Thirumalai Naickar added artistic features, notably the Nayaka art showcased in the kalyan mandapam.

#### 3. PATACHITRA

##### SOURCE: LIVESCIENCE

First-generation women patachitra artists from the village of Naya in West Bengal are gaining recognition globally for their online sales, encouraging future generations to continue in the profession.



##### About Patachitra:

- Patachitra, also known as Pattachitra, is a traditional scroll painting form originating from the eastern Indian states of Odisha and West Bengal, believed to date back to the 12th century.
- The term "Patta" means "cloth" and "Chitra" means "picture" in Sanskrit, reflecting the art form's cloth-based nature.
- Patachitra paintings are renowned for their intricate details and often depict mythological narratives and folktales, particularly stories of Hindu deities.
- Originally, Pattachitra served ritual and souvenir purposes for pilgrims visiting temples in Odisha, while in Bengal, it was used as a visual aid during song performances.
- Creating Pattachitra involves layering cotton sarees with tamarind paste and clay powder to

create a sturdy canvas. Both cotton and silk canvases are now used, with colors derived from natural sources like lamp soot and powdered conch shells.

- Each painting can take weeks or months to complete, with artists often starting by outlining the borders before filling in colors directly without initial sketches.

## 4. KUTCH AJRAKH

### SOURCE: TIMES OF INDIA

Kutch Ajrakh, a traditional textile craft, has received the Geographical Indication (GI) certificate from the Controller General of Patents, Designs, and Trademarks.



- Originating from the vibrant region of Kutch in Gujarat, Ajrakh holds deep cultural significance in Gujarat, particularly in areas like Sindh, Barmer, and Kutch, where its legacy spans millennia.
- **The Ajrakh craft involves a meticulous process of hand-block printing on treated cotton cloth, resulting in intricate designs infused with rich symbolism and history.**
- **The name "Ajrakh" derives from "Azrak," meaning indigo, a key dye used to achieve the characteristic blue color in Ajrakh prints.**
- Traditionally, Ajrakh prints incorporate three main colors: blue symbolizing the sky, red symbolizing the land and fire, and white symbolizing the stars.
- **Textiles are treated with vegetable and mineral colors, and the fabric undergoes multiple washing cycles, sometimes up to eight times, to achieve the desired hues and patterns.**
- Introduced to the region over 400 years ago by Sind Muslims, Ajrakh is deeply intertwined with the cultural identity of nomadic pastoralist and agricultural communities like the Rabaris, Maldharis, and Ahirs, who often wear Ajrakh-printed cloth as turbans, lungis, or stoles.

## 5. KOOTHANDAVAR FESTIVAL

### SOURCE: INDIAN EXPRESS

The Koothandavar festival occurs in the Tamil month of Chithirai (mid-April to mid-May) in Koovagam, Tamil Nadu, lasting for 18 days.



### Historical Background:

- **It originates from a Tamil version of the Mahabharata, where a character named Aravan offers himself as a sacrifice for the Pandavas' victory.**
- Despite having a boon of marriage, no woman wanted to marry him due to the fear of widowhood.
- **Lord Krishna, in the form of Mohini, marries Aravan, and upon his sacrifice, mourns him as a widow.**

### Rituals:

- The main ritual of the festival revolves around Lord Aravan's sacrificial ceremony.
- **On the 17th day, transwomen gather to marry Lord Aravan, and the following day, he is sacrificed.**
- The trans women who married him then undergo the rituals of widowhood, mourning his death.

## 6. PALIYAR TRIBE

### SOURCE: DOWN TO EARTH

The Paliyar tribe, also known as Palaniyan, gets its name from "Palani," a place in Tamil Nadu. They are also called Paliyans, Pazhaiyares, and Panaiyars.



- **Distribution:** They reside in various districts of Tamil Nadu like Madurai, Thanjavur, Pudukkottai, Tirunelveli, and Coimbatore.
- **Language and Communication:** Paliyars speak Tamil and use Tamil script for communication within and outside their community.
- **Traditional Occupation:** Historically, they were hunters and gatherers, living in the forests of the Western Ghats.





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- **Religious Practices:** They worship Vanadevadai in the forest and honor the god Karuppan by visiting a remote forest area with their families.
- **Funeral Customs:** Unlike cremation, the Paliyar tribes traditionally bury their dead near their residential areas, typically on the western side.



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## ENVIRONMENT

### I. BIODIVERSITY AND CONSERVATION

#### 1. EXPERT PANEL FAVOURS REOPENING ELEPHANT CORRIDOR, SHIFTING CHINNAKANAL COLONIES

##### SOURCE: THE HINDU

The expert panel appointed by the Kerala High Court has submitted a report outlining recommendations to address the human-wildlife conflict in Chinnakal, Idukki district.

- The report highlights the case of Arikomban, a wild elephant relocated due to repeated raids on settlements and emphasizes the need for long-term solutions.

##### Problem Analysis

- Habitat Fragmentation:** The current isolation of the elephant population in Chinnakal is a key driver of conflict. Elephants lack access to sufficient resources and their natural habitats.
- Arikomban's Translocation:** The report acknowledges the controversial relocation of Arikomban and argues for alternative approaches.

##### Measures

- Elephant Corridor Restoration:** The panel proposes reopening the traditional elephant corridor between Anayirankal and Old Devikulam.
- This 60-acre shola forest** is crucial for connecting Chinnakal's elephants to the broader Munnar landscape, encompassing a vast 4,500 sq. km area.
- Voluntary Relocation:** The report suggests the voluntary relocation of two colonies occupying 381 acres in Chinnakal.
- Conservation Reserve:** Establishing Chinnakal as a conservation reserve could deter illegal activities and promote wildlife protection.

##### ELEPHANT CORRIDOR

An elephant corridor is a narrow strip of land that acts as a passage between two or more areas of elephant habitat.

- There are around 33 notified elephant reserves in India, spread over 14 states. These reserves are crucial for the conservation of Asian elephants, an endangered species.

These corridors are crucial for the survival of elephant populations.

- Movement:** Elephants are wide-ranging animals and need to move between different areas for various reasons.

- Habitat Fragmentation:** Unfortunately, human activities like development projects and agriculture often fragment elephant habitats.

The authority over elephant reserves in India is a shared responsibility between the Central and State governments: Central Government (Ministry of Environment, Forest and Climate Change - MoEFCC):

- Sets policy guidelines for elephant conservation and management.
- Provides financial and technical assistance to states for managing elephant reserves.
- Issues notifications declaring areas as elephant reserves under the provisions of the Wildlife Protection Act, 1972.
- Oversees the implementation of the Wildlife Protection Act and ensures compliance by the states.

##### State Governments:

- Have primary responsibility for managing elephant reserves within their jurisdiction.
- Prepare management plans for each elephant reserve in consultation with local stakeholders.
- Constitute Elephant Reserve Management Committees (ERMCS) for each reserve. These committees involve representatives from the Forest Department, local communities, and NGOs to ensure participatory management.**
- Implement conservation measures like habitat improvement, anti-poaching patrols, and conflict mitigation initiatives.

##### Elephants use corridors year-round for various reasons:

- Seasonal:** They follow food and water, traveling more during dry seasons to reach resources.
- Breeding:** Females use corridors to find birthing grounds and social groups.
- Safety:** They avoid human activity and use corridors for safe passage between protected areas.
- Habitat loss:** When their habitat is fragmented, corridors become crucial for connecting isolated areas.

##### CONSERVATION RESERVES UNDER WILDLIFE PROTECTION ACT, 1972

- Declaration:** State governments can declare an area, particularly those adjacent to sanctuaries or parks, as conservation reserves (Section 36).
- Focus:** Primarily for the protection of wildlife and its habitat, with a specific emphasis on areas that complement existing protected areas.
- Management:** Managed by the state Forest Department, similar to sanctuaries.
- Restrictions:** Similar to sanctuaries, activities like hunting, grazing, or damaging vegetation are prohibited.

- **Community Involvement:** Unlike sanctuaries, the Act encourages consultation with local communities before declaring a conservation reserve.

### MAINS QUESTION:

Q. Discuss the significance of elephant corridors in mitigating human-wildlife conflict and the role of conservation reserves in wildlife protection. (150 WORDS)

## 2. WORLD WATER CRISIS

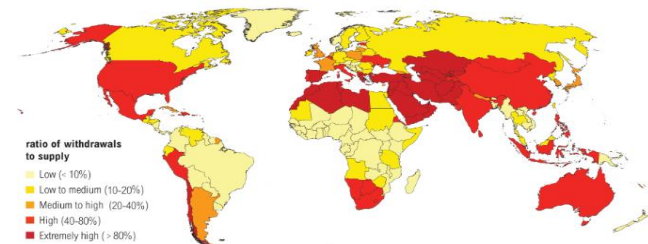
### SOURCE: WORLD BANK REPORT

The global water crisis poses significant challenges to human health, economic development, and environmental sustainability.

Addressing this crisis requires understanding its multifaceted nature and implementing comprehensive solutions at local, national, and international levels.

The recent report "**Water for Shared Prosperity**" by the **World Bank** underscores the urgency of action to mitigate the impacts of water scarcity and ensure equitable access to clean water and sanitation services worldwide.

Water Stress by Country: 2040



### Key Highlights of the Report:

#### Alarming Water Scarcity Statistics:

- According to the report, as of 2022, 2.2 billion people lack access to safely managed drinking water services, and 3.5 billion lack access to safely managed sanitation.
- Furthermore, eight out of ten people without basic drinking water and sanitation services reside in rural areas, exacerbating disparities in access.

#### Regional Disparities in Access to Water:

- The report highlights significant disparities in freshwater distribution globally. **For instance, despite having 36% of the global population, China and India collectively hold only 11% of freshwater resources.**
- Conversely, North America, with just 5% of the population, possesses 52% of freshwater resources, indicating regional imbalances in water availability.

#### Impact of Climate Change:

- Climate change intensifies water-related risks, with developing countries facing more severe and prolonged droughts and floods.

- **Over 800 million people are at high risk of drought, and twice as many live in flood-prone areas, exacerbating challenges in water management and access.**

#### Human Capital and Economic Growth:

- Access to water and sanitation services is crucial for educational attainment and overall human capital development.
- **In low-income countries, 56% of jobs are in water-intensive sectors, which are highly sensitive to water availability, impacting economic productivity.**

#### Social Cohesion and Conflict:

- Effective water management fosters community trust and cooperation, whereas mismanagement can exacerbate conflicts over resources.
- **Proper water resource management contributes to peace and social cohesion by promoting inclusivity and reducing tensions among communities.**

#### Extent of Water Scarcity in India:

##### India's Water Crisis:

- The "**Composite Water Management Index**" report by NITI Aayog highlights that nearly **600 million people in India experience high to extreme water stress.**
- Additionally, 8 million children below the age of 14 in urban India are at risk due to poor water supply, indicating the severity of the crisis.

#### Disproportionate Water Resources:

- Despite housing a staggering 18% of the global population, India has only 4% of the world's freshwater resources, leading to immense strain on available water.
- **Groundwater depletion and drying rivers further exacerbate water scarcity challenges, especially in regions reliant on agriculture.**

#### Threat to Agriculture and Food Security:

- Agriculture, a major water consumer in India, faces challenges from declining groundwater levels and erratic monsoon patterns.
- **A potential demand-supply gap of up to 570 billion cubic meters by 2030 in the agricultural sector alone poses significant threats to food security and agricultural productivity.**

#### Impact of Climate Change:

- Erratic monsoon patterns and glacier melt contribute to water scarcity, affecting rivers and reservoirs across India.
- **The southern states of India, including Karnataka, Tamil Nadu, Andhra Pradesh, and Telangana, observe severe water crises due to low rainfall and post-monsoon deficiencies.**

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### Micro-Irrigation Techniques:

- Promote the adoption of drip irrigation and sprinkler systems to reduce water usage in agriculture and increase water efficiency.

### Rainwater Harvesting:

- Encourage the implementation of rainwater harvesting techniques to capture and store rainwater for household and community use, particularly in water-stressed areas.

### Desalination:

- Invest in desalination technologies to treat seawater for coastal communities facing water scarcity, providing a reliable alternative water source.

### Nature-Based Solutions:

- Restore wetlands and natural water bodies to improve water quality and replenish groundwater reserves, promoting ecosystem-based approaches to water management.

### Water ATMs:

- Establish water ATMs in underserved areas to provide clean water, utilizing prepaid cards to encourage responsible water usage and ensure equitable access.

### Climate-Smart Agriculture:

- Promote climate-resilient agricultural practices, including drought-resistant crops and efficient water management techniques, to mitigate the impact of water scarcity on food production.

### Public Awareness Campaigns:

- Launch public awareness campaigns to educate communities about water conservation practices and promote responsible water use behaviors, fostering a culture of sustainability and stewardship.

### MAINS QUESTION:

Q. Discuss the impact of climate change on water scarcity globally and in India, highlighting the urgency for comprehensive solutions to address this multifaceted crisis, as outlined in the "Water for Shared Prosperity" report by the World Bank. (150 WORDS)

## II. CLIMATE CHANGE

### 3. INDIAN OCEAN WARMING: A CAUSE FOR CONCERN

#### SOURCE: THE HINDU

The Indian Ocean has warmed by 1.2°C since 1950 and is projected to heat up further (1.7°C to 3.8°C) by 2100.

#### Concerns regarding Marine Heatwaves:

- These underwater heatwaves, linked to cyclones, are expected to become ten times more frequent,

reaching 220-250 days per year compared to the current 20 days.

- Impact on Marine Life:** The warm water is likely to create a "near-permanent heatwave state" harming coral reefs, seagrasses, and kelp forests, negatively affecting fisheries.
- Heat Content on the Rise:** The Indian Ocean's heat content (energy stored in the water) is increasing rapidly, projected to reach rates 3-5 times higher in the future.
- Equivalent to Atomic Bombs:** This heat gain is like adding the energy of one Hiroshima bomb detonation every second for a decade.
- Sea Level Rise:** Thermal expansion of water due to heat is a major contributor to rising sea levels in the Indian Ocean, more than melting glaciers and ice.

#### Marine Heatwaves

Marine heatwaves are just like heatwaves on land, but they occur in the ocean.

Caused by rising global temperatures, these events see large areas of ocean water experience abnormally high temperatures for extended periods.

- Imagine a beach vacation** – the perfect water temperature might be 25°C. A marine heatwave could push that temperature to 30°C or higher, and it might last for weeks or even months.
- These warm waters have a ripple effect. They can:**
- Fuel cyclones:** Warmer water provides more energy for storms to develop and intensify.
- Harm marine life:** Coral reefs bleach and die, seagrasses struggle, and fish populations can be disrupted.
- Impact fisheries:** With stressed marine ecosystems, fish catches can decline, affecting food security and livelihoods.

#### How to Tackle Marine Heat Waves

- Reduce Global Warming:** Curb greenhouse gas emissions: Implementing stricter regulations and transitioning to renewable energy sources are crucial for slowing down ocean warming.
- International cooperation:** Global efforts through agreements like the Paris Agreement are essential to achieve significant reductions in emissions.
- Build Ocean Resilience:** Marine protected areas: Establishing and enforcing marine protected areas can provide sanctuaries for marine life, allowing them to recover from heatwave impacts.
- Sustainable fishing practices:** Preventing overfishing allows fish populations to be more robust in the face of environmental stressors like heatwaves.
- Research and innovation:** Investing in research on heatwave prediction, coral reef restoration





techniques, and heat-resistant marine life can inform future adaptation strategies.

- **Public awareness:** Raising public awareness about the threats posed by marine heatwaves can encourage support for climate action and sustainable practice.

### III. LAND DEGRADATION

#### 4. THEMATIC REPORT ON RANGELANDS AND PASTORALISTS

##### SOURCE: INDIAN EXPRESS

The UN Convention to Combat Desertification (UNCCD) recently released a thematic report focusing on rangelands and pastoralists, highlighting the critical issue of land degradation in these areas.

This report sheds light on the importance of protecting and restoring rangelands, which play a significant role in supporting biodiversity, storing carbon, and providing livelihoods for pastoral communities.

##### UN Convention to Combat Desertification (UNCCD):

- UNCCD is a legally binding agreement established in 1994 to combat desertification and drought.
- It aims to protect and restore land while ensuring a safer, more sustainable future for vulnerable ecosystems and communities.
- The convention focuses on drylands, including arid, semi-arid, and dry sub-humid areas, which are particularly susceptible to land degradation.

##### Rangelands:

- Rangelands are vast areas covered by grasses, shrubs, woodlands, wetlands, and deserts, used by both wild animals and domestic livestock for grazing.
- These areas cover approximately 47% of the Earth's surface and 54% of the world's land.
- Rangelands are characterized by low and erratic precipitation, poor drainage, rough topography, and low soil fertility.

##### Significance of Rangelands:

- Rangelands play a crucial role in storing carbon, providing habitats for wildlife, supporting rivers and wetlands, and maintaining carbon balance.
- They contribute to global food production and represent a significant portion of the planet's carbon reservoir.
- Additionally, rangelands offer ecosystem services such as grazing, wildlife habitat, watershed health, and recreational opportunities.

##### Key Highlights of the Report:

- **Degradation of Rangelands:** Nearly half of the world's rangelands are degraded due to factors like

climate change, population growth, land-use change, and expansion of farmlands.

- **Importance of Pastoralists in India:** Pastoralists contribute significantly to India's economy through livestock rearing and milk production, accounting for a substantial portion of the agricultural GDP.
- **Recognition of Pastoralists' Rights:** Pastoralist communities in India, such as the Maldharis, Van Gujjars, and Rabaris, face marginalization and lack recognition of their rights and access to markets.
- **Protection of Grasslands in India:** Grasslands in India are threatened ecosystems and have been largely overlooked in environmental conservation efforts, with policies favoring forestry-based interventions.
- **Successes and Shift in Attitude:** Some laws, like the Forest Rights Act 2006, have helped pastoralists obtain grazing rights, indicating a gradual shift towards recognizing the socio-ecological role of rangelands and pastoralism in India.

##### Challenges Faced:

- **Marginalization of Pastoralist Communities:** Pastoralists in India are marginalized and have limited influence on policy decisions, leading to uncertainty over land rights and access to common land.
- **Lack of Conservation Efforts:** Grasslands in India are under threat, with less than 5% falling within protected areas, and policies often prioritize forestry over grassland conservation.
- **Degradation and Overuse:** Rangelands face degradation due to overgrazing, deforestation, and conversion for agricultural purposes, posing significant environmental and socio-economic challenges.

##### Policy Implications and Recommendations:

- **Enhanced Recognition and Rights:** There is a need to recognize and protect the rights of pastoralist communities, ensuring their access to grazing lands and markets.
- **Conservation Strategies:** Policies should prioritize the conservation of grasslands and rangelands, incorporating sustainable land management practices and community-based conservation initiatives.
- **Capacity Building and Awareness:** Efforts should be made to raise awareness about the importance of rangelands and pastoralism, while providing training and support to pastoralist communities for sustainable land use practices.
- **Policy Coherence:** There is a need for coherence among environmental, agricultural, and land-use policies to ensure the sustainable management of



rangelands and address land degradation effectively.

### Mains Question:

Q. Discuss the significance of rangelands and pastoralist communities in India, highlighting the challenges they face and proposing policy measures to address their concerns. (150 WORDS)

## IV. PRELIMS POINTERS IN NEWS

### 5. PEUCETIA CHHAPARAJNIRVIN

#### SOURCE: DOWN TO EARTH

A Daryapur-based arachnologist recently identified a new species of green lynx spider named *Peucetia chhaparajnrvin*, discovered in the Tal Chhapar Wildlife Sanctuary in Rajasthan's Churu district.



#### About *Peucetia chhaparajnrvin*

- *Peucetia chhaparajnrvin* is named after its discovery location, Tal Chhapar, and is found on the green leaves of the *Vachellia nilotica* (babul) tree.
- The spider's green coloration helps it blend with its surroundings, aiding in ambushing prey, while its long legs enable swift movement.
- As nocturnal hunters, these spiders feed on small insects, making them valuable predators in their ecosystem.
- Lynx spiders, belonging to the family Oxyopidae, are known for their active hunting behavior, eschewing web-building in favor of pouncing on prey.
- They are significant insect predators, commonly found in low shrubs and herbaceous vegetation, where they hunt for prey.
- Lynx spiders typically have hexagonally arranged eyes and abdomens that taper to a point, with some species exhibiting colorful striped abdomens and spiky legs.

### 6. RED COLOBUS MONKEYS

#### SOURCE: SCIENCEDAILY

Red Colobus monkeys, found across Africa, are essential indicators of biodiversity and are categorized as a rare and imperilled species.



#### About Red Colobus monkeys:

- They belong to the colobine group of monkeys, which primarily feed on leaves, distinguishing them from the omnivorous cercopithecines.
- Besides Africa, colobines also include langurs from South and Southeast Asia.
- Red Colobus monkeys inhabit forests from Senegal to the Zanzibar Archipelago but face significant threats to their survival.
- The majority of red colobus species are at risk of extinction, with over half of them classified as Endangered or Critically Endangered on the IUCN Red List.
- Threats to their survival include hunting for trade and local consumption, as well as habitat loss, degradation, and fragmentation due to various human activities such as logging, mining, and agriculture.
- To address these challenges, the Red Colobus Conservation Action Plan was initiated by the International Union for Conservation of Nature (IUCN) Species Survival Commission Primate Specialist Group and the African Primatological Society.
- The action plan aims to prioritize the conservation of red colobus monkeys to safeguard Africa's tropical forests and reduce unsustainable hunting practices.
- It involves the formation of a Red Colobus Working Group (RCWG) to implement the action plan and a Red Colobus Conservation Network (RCCN) to facilitate communication, capacity-building, and monitoring of conservation efforts.

### 7. ORANGUTANS

#### SOURCE: INDIAN EXPRESS

Orangutans are large arboreal mammals known for their distinctive red fur.

- They primarily inhabit the Indonesian island of Sumatra and both the Malaysian and Indonesian parts of Borneo.
- Orangutans spend over 90% of their waking hours in trees, adapted with long arms and grasping hands and feet.



- **There are three species: Bornean, Sumatran, and Tapanuli, sharing 96.4% of human genes.**
- Adult males can reach heights of 1.3 meters and weigh up to 130 kg, with wide cheek pads distinguishing older males.
- **Their diet consists mainly of fruits and leaves, supplemented with nuts, bark, insects, and occasionally bird eggs.**
- Orangutans have a semi-solitary lifestyle but exhibit social tolerance during periods of high fruit abundance.
- **All three species are classified as "Critically Endangered" due to habitat loss, poaching, and human-wildlife conflict.**
- **Recent observation of a wild male orangutan using chewed-up leaves of a medicinal plant to treat a facial wound is the first known instance of such behavior.**
- This behavior adds to evidence that non-human animals, like humans, use plants for medicinal purposes, highlighting the intelligence and adaptability of orangutans.

## 8. ARECANUT CULTIVATION

### SOURCE: INDIAN EXPRESS

Arecanut, also known as betel nut or supari, is sourced from the arecanut palm and is a significant commercial crop in India.



- **Climatic Requirements:** Arecanut thrives in regions between 28° north and south of the equator, with temperatures ranging from 14°C to 36°C.
- **Soil Suitability:** Ideal soil types include gravelly laterite and red clay, while unsuitable soils include sandy, alluvial, brackish, and calcareous types.

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- **Rainfall:** Arecanut cultivation requires an annual rainfall of around 750 mm.
- **Altitude Tolerance:** It can be cultivated up to 1000 m above mean sea level.
- **Production and Consumption:** India leads both in arecanut production and consumption. Major cultivating states include Karnataka, Kerala, Assam, Tamil Nadu, Meghalaya, and West Bengal.

## 9. GLYPTOTHORAX PUNYABRATAI

### TOPIC: (GS3) ENVIRONMENT – SOURCE: INDIAN EXPRESS

Recently identified by ICAR-NBFGR, this new catfish species was found in the pristine waters of Arunachal Pradesh, India.

- **Habitat:** It was discovered in the Tung Stream, a tributary of the Tissa River, located in the Brahmaputra River basin.
- **Classification:** Glyptothorax punyabratai is categorized as a new species within the catfish family.



### Catfish:

- **Diversity:** Catfish constitute a vast group of freshwater fishes, boasting over 2000 species worldwide.
- **Habitat Range:** While most catfish inhabit freshwater environments, a small number are found in marine waters.
- **Behavior:** Many catfish species are nocturnal, preferring to be active during the night.
- **Ecological Niche:** Catfish are predominantly bottom-dwellers, residing near the benthic zone of aquatic habitats.
- **Physical Characteristics:** They typically have cylindrical bodies with flattened ventrals for benthic feeding. The presence of long barbels around the mouth, resembling cat whiskers, is a characteristic feature.
- **Anatomical Traits:** Most catfish species lack scales and possess leading spines in their dorsal and pectoral fins, distinguishing them from other fish species.



## 10. DICE SNAKES

**SOURCE: NDTV**

Dice snakes, also known as water snakes, are nonvenomous snakes belonging to the Colubridae family, subfamily Natricinae.



- **Size and Sexual Dimorphism:** Females of the species are larger than males.
- **Distribution:** Found across much of Eurasia, including Egypt.
- **Habitat:** Dice snakes inhabit areas near water bodies like rivers, lakes, streams, ponds, as well as adjacent grasslands. They can also be found in coastal regions, plantations, and urban areas.

### Unique Behavior:

- They employ a unique defense mechanism of feigning death to evade predators.
- **This tactic involves theatrical displays, including oozing "mouthfuls" of blood, and emitting a foul-smelling secretion from their cloaca.**
- The effectiveness of this behavior depends on various factors such as sex, injuries, body temperature, size, age, presence of food or eggs, and previous encounters with predators.

### Threats:

- **Habitat loss in wetland areas, pollution, roadkill, persecution by humans,** and collection for the pet trade pose significant threats to their survival.

### Conservation Status:

- **Listed as Least Concern on the IUCN Red List,** but still faces threats requiring conservation attention.

## 11. COLOR-CODED WEATHER WARNINGS

**SOURCE: TIMES OF INDIA**

The India Meteorological Department (IMD) has issued color-coded alerts for several districts in Kerala due to potential isolated heavy to very heavy rainfall.

IMD uses color-coded weather warnings to inform people about severe or hazardous weather that could cause damage, disruption, or danger to life.

	<b>NO SEVERE WEATHER EXPECTED</b> Keep up to date with latest forecast
	<b>BE AWARE</b> Remain alert and keep up to date with latest forecast
	<b>BE PREPARED</b> Remain vigilant, keep up to date with latest forecast and take precautions where possible
	<b>TAKE ACTION</b> Remain extra vigilant, keep up to date with latest forecast. Follow orders and any advice given by authorities and be prepared for extraordinary measures

The four color-coded warnings are:

- **Green:** No warning.
- **Yellow:** Be aware.
- **Orange/Amber:** Be prepared.
- **Red:** Take action.

**IMD was established in 1875 and is an agency under the Ministry of Earth Sciences, Government of India.**

It is responsible for meteorological observations, weather forecasting, and seismology.

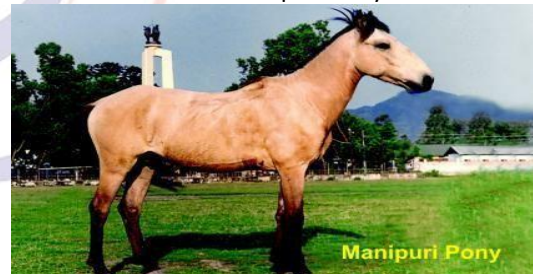
**IMD's headquarters is in New Delhi.**

IMD is one of the six Regional Specialized Meteorological Centres of the World Meteorological Organization.

## 12. MANIPURI PONY

**SOURCE: HINDUSTHAN TIMES**

Manipur government collaborates with various organizations to save the Manipuri Pony from extinction.



### Manipuri Pony (Meitei Sagol):

- One of seven recognized horse and pony breeds in India.
- Other breeds include Marwari Horse, Kathiawari Horse, Zanskari Pony, Spiti Pony, Bhutia Pony, and Kachhi-Sindhi Horse.
- **Characteristics:** Small breed (11 to 13 hands), known for stamina, agility, intelligence, speed, maneuverability, and adaptability to harsh conditions.
- **Historical significance:** Original polo pony; modern polo derived from Manipur's traditional sport, Sagol Kangjei.
- **Cultural importance:** Integral to Manipuri life, used in traditional events like Lai Haraoba, polo, horse races, and as cavalry mounts in the 17th century.



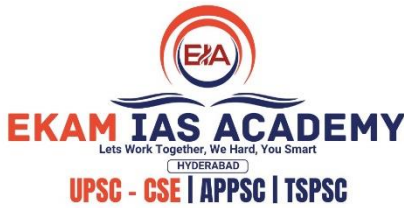
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- **Status:** Declared an Endangered Breed by the Manipur government in 2013.

### Factors for Decline:

- Shrinkage of wetlands (natural habitat) due to urbanization and encroachment.
- Lack of polo grounds in rural Manipur.
- Restriction of pony usage except for polo.
- Uncontrolled diseases.
- Exodus of ponies to neighboring states and countries.



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## SOLID WASTE MANAGEMENT

Solid waste management is a critical issue in India, particularly in urban areas like New Delhi, where improper waste disposal and management pose severe threats to public health and the environment.

With India generating millions of tonnes of waste annually, effective management practices are essential to mitigate these risks.

### About Solid Waste

Solid waste includes household waste, sanitary waste, commercial waste, institutional waste, market waste, street sweepings, silt from drains, horticulture, agriculture and dairy waste, treated biomedical waste, excluding industrial, bio-medical, e-waste, battery, and radioactive waste.

- Statistics:** India, with 18% of the global population, generates 12% of the world's municipal waste. Annually, India produces 62 million tonnes of waste, with only 70% collected, 20% treated, and the remainder dumped in landfills.



### Key Issues in Solid Waste Management

#### Poor Implementation of Rules

- Garbage Bins:** Many metro cities have insufficient, old, or damaged garbage bins.
- Waste Segregation:** Lack of segregation at the source leads to mixed waste in landfills, violating the Solid Waste Management Rules 2016.
- Irregular Collection:** Some areas lack regular waste collection, leading to accumulation and littering.

#### Problems with Dumping Sites

- Land Scarcity:** Waste processing plants face land shortages, leading to untreated waste and illegal dumping.
- Environmental Hazards:** Unprocessed waste results in methane emissions, leachates, and landfill fires.
- Biomining Delays:** Efforts to manage legacy waste are slow, extending the environmental impact.

#### Lack of Data Collection

- Private Sector Challenges:** Without historical or regional data, private companies struggle to assess the market size and profitability of waste management projects.

### Formal and Informal Waste Management Systems

- Service Gaps:** Municipal services often fall short in low-income areas, where informal waste pickers operate without safety gear, exposing them to health risks.

### Lack of Public Awareness

- Improper Practices:** There is widespread lack of awareness about proper waste management, leading to littering and improper disposal habits.



### Solid Waste Management Rules 2016

- Replaced Previous Rules:** Superseded the Municipal Solid Wastes (Management and Handling) Rules, 2000.
- Segregation at Source:** Generators must segregate waste into wet (biodegradable), dry (plastic, paper, metal, wood), and domestic hazardous waste.
- Responsibilities of Generators:**
  - User Fee:** Generators must pay waste collectors.
  - Spot Fine:** For littering and non-segregation.
  - Biodegradable Waste:** Should be composted or bio-methanated on premises as much as possible.
- Manufacturers' Responsibility:** Those producing disposable products must assist local authorities in waste management.

#### Other Initiatives Related to Waste Management

**Plastic Waste Management Rules 2016:** Minimizes plastic waste generation and promotes segregated storage.

**Bio-Medical Waste Management Rules 2016:** Manages daily biomedical waste from healthcare facilities.

**Waste to Wealth Portal:** Identifies technologies to treat waste and generate energy.

**Waste to Energy:** Converts solid waste into electricity and heat.

**Project REPLAN:** Produces carry bags from plastic waste and cotton fiber.

#### Way Forward

##### Role of Municipalities

- Enhance Capacities:** Cities must boost waste processing capabilities, considering future growth.



- **Consultation:** Identify land, set up, and operate plants through stakeholder consultation.

#### Waste-to-Energy Justification

- **Refuse-Derived Fuel (RDF):** Non-recyclable dry waste with high calorific value can be used for power generation.

#### Decentralized Waste Processing

- **Collaborative Efforts:** Metros like Delhi should work with neighboring states to set up composting facilities.
- **Micro-Composting Centres (MCC):** Implement in each ward for wet waste (inspired by Tamil Nadu & Kerala).
- **Dry Waste Collection Centres (DWCC):** Establish in each ward for dry waste (inspired by Bengaluru).

#### Integrated Approach

- **Combination of Methods:** Use both decentralized options and large-scale facilities to ensure comprehensive waste treatment.

#### Conclusion

Effective solid waste management is essential for maintaining public health and environmental safety.

By addressing current challenges and implementing strategic solutions, India can improve its waste management practices, leading to a cleaner and healthier environment.

**Empowering municipalities, enhancing public awareness, and integrating innovative technologies are key steps towards sustainable waste management.**

#### UPSC MAINS QUESTION

Q. Discuss the major challenges in solid waste management in urban India and suggest sustainable solutions to mitigate these issues. (150 WORDS)

## SCIENCE AND TECHNOLOGY

### I. MEDICAL HEALTH/VACCINES/DISEASES

#### 1. ASTRAZENECA SUBMISSION OVER COVID VACCINE NOTHING NEW, SAY DOCTORS

##### SOURCE: THE HINDU

Recent developments regarding AstraZeneca's COVID-19 vaccine, Covishield, have brought attention to the potential side effect of Thrombosis with Thrombocytopenia Syndrome (TTS), a rare but serious condition involving blood clotting.

- Doctors in India emphasize that this information is not new and has been acknowledged since the vaccine's introduction.

##### Key observations

- **AstraZeneca admitted in UK court** documents that its vaccine may cause TTS in very rare cases, with potential life-threatening consequences.
- **Doctors in India assert that they were already aware** of this risk, as it has been included in the vaccine's product information and warnings since its introduction.
- **The majority of TTS cases occurred within the first 21 days** following vaccination, with some cases resulting in fatal outcomes.
- **Experts emphasize that TTS is an exceptionally rare side effect**, and individuals vaccinated in 2024 are not at risk of developing it.
- **The acknowledgment of clotting risks associated with the vaccine** is not new, as similar admissions have been made previously by AstraZeneca.

##### Thrombosis with Thrombocytopenia Syndrome (TTS)

TTS is a rare blood clotting condition with low platelet count. Associated with specific COVID-19 vaccines (adenovirus vector type).

##### Symptoms:

- Occur 4-42 days after vaccination.
- May include headaches, vision changes, chest pain, leg pain/swelling.

##### Importance of Awareness:

- Early diagnosis and treatment are crucial for TTS management.
- Benefits of vaccination outweigh the very low risk of TTS.

##### Informed Vaccine Decision-Making:

##### Importance:

- Vaccines are one of the most effective tools in preventing infectious diseases.
- Informed decisions regarding vaccination ensure optimal individual and community health.
- Understanding benefits and risks empowers individuals to make responsible choices.

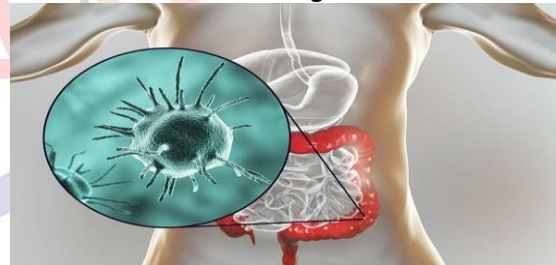
##### Strategies for Achieving Informed Decision-Making:

- **Seek reliable sources:** Consult credible websites (WHO, CDC), doctor recommendations, and scientific publications.
- **Evaluate risks and benefits:** Weigh the potential risks of the vaccine against the disease it protects against.
- **Consider individual factors:** Discuss underlying health conditions and allergies with a healthcare professional.
- **Address vaccine hesitancy:** Clarify misconceptions and address concerns through open communication with doctors.

#### 2. FUSOBACTERIUM NUCLEATUM

##### SOURCE: DOWN TO EARTH

Fusobacterium nucleatum is a type of bacteria commonly found in the human mouth and gastrointestinal tract.



- It's considered an opportunistic pathogen due to its frequent presence in anaerobic samples from patients with various infections.
- **Recent research identified a specific subtype of F. nucleatum in higher quantities in colorectal cancer (CRC) tumors.**
- This subtype, known as F. nucleatum animalis (Fna), was the predominant type found in tumor samples.
- **Further genetic analysis divided Fna into two groups, with only one, called Fna C2, found in substantial numbers in CRC tumors.**
- Fna C2 exhibits higher resistance to acid, potentially allowing it to survive passage from the mouth to the intestines.
- **It can hide inside certain tumor cells, evading the immune system.**
- **Fna C2 is adept at utilizing nutrients found in the gastrointestinal tract, different from those in the mouth.**
- The findings suggest a potential link between Fna C2 and CRC development, highlighting the



importance of understanding bacterial subtypes in cancer research.

- **Further studies may explore the role of Fna C2 in CRC progression and its potential as a therapeutic target.**

### 3. FOOT ROT DISEASE

#### SOURCE: INDIAN EXPRESS

Ludhiana's Punjab Agricultural University has introduced *Trichoderma asperellum* as a biocontrol agent to tackle foot rot disease in Basmati rice varieties. This agent has been registered with the Central Insecticides Board and Registration Committee (CIBRC).



#### Foot Rot Disease:

- It's a fungal disease affecting Basmati rice, particularly during the seedling stage and even after transplantation if infected seedlings are used.
- The fungus *Fusarium verticillioides* causes it, spreading through the plant's roots and affecting the stem base, causing yellowing, elongation, drying, and eventual death of the seedlings.

#### Current Treatment:

- Traditionally, *Trichoderma harzianum* and chemical fungicides like Sprint 75 WS (carbendazim + mancozeb) are used before sowing and transplantation.
- However, chemical treatments can harm soil and potentially harm consumers due to toxic residues.

**Trichoderma asperellum:** It's a biocontrol agent, offering a non-chemical alternative to traditional pesticides. It helps manage foot rot disease without causing harm to the environment or consumers.

**Benefits:** Using *Trichoderma asperellum* reduces reliance on harmful chemicals, promotes sustainable agriculture, and ensures safer rice production for consumers.

### 4. THE CHALLENGE OF EXTRA-PULMONARY TB

#### SOURCE: THE HINDU

Exploring Extra-Pulmonary Tuberculosis (EPTB), a form of tuberculosis affecting organs beyond the lungs, presents unique challenges in detection and management.

While pulmonary TB garners significant attention, EPTB's elusive nature and diverse manifestations often result in underdiagnosis and inadequate treatment.

#### Extra-Pulmonary Tuberculosis (EPTB):

**This type of tuberculosis occurs when the bacteria infects organs other than the lungs.**

#### Common Sites:

- EPTB can affect almost any part of the body, with some of the most frequent sites being: Lymph nodes (especially in the chest), Pleural space (lining around the lungs), Bones and joints (especially the spine and hips), Urinary tract (kidneys and bladder), Meninges (membranes surrounding the brain and spinal cord)

**Symptoms:** EPTB symptoms vary greatly depending on the affected organ. For example, lymph node TB may cause swelling, while bone TB may cause pain and difficulty moving. Miliary TB can cause fever, weight loss, and fatigue.

**Diagnosis:** Similar to pulmonary TB, diagnosis may involve chest X-rays, sputum tests, biopsies, and imaging tests like CT scans.

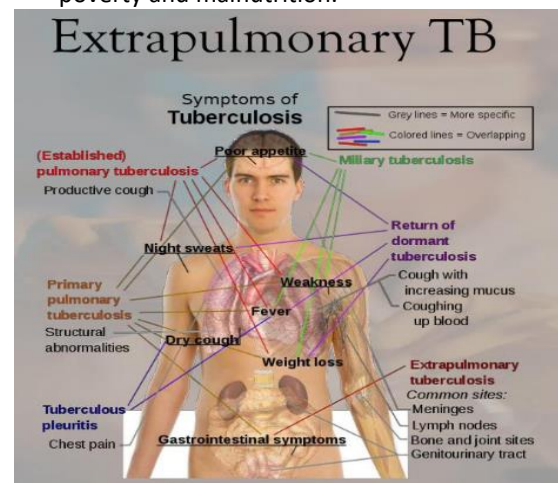
Immune privilege allows TB infections in these organs to persist even after lung infection resolves.

#### Burden and Detection Challenges

- Over 10 million new TB cases are reported yearly, with India contributing significantly.
- EPTB's burden is hard to estimate due to its stain-negative nature and diverse presentations, often mimicking other conditions.

#### Present TB Burden:

- Despite ongoing efforts, India faces a significant TB challenge:
- India has the highest TB burden in the world, with an estimated 24.2 lakh (2.42 million) cases notified in 2022.
- The case notification rate is around 172 cases per lakh population.
- Challenges include under-diagnosis, drug resistance, and social determinants of TB like poverty and malnutrition.



## Focus on Pulmonary TB

- Efforts primarily concentrate on pulmonary TB due to its higher prevalence and role in disease spread.
- However, EPTB affects a substantial number and can lead to severe complications like vision loss.

## Challenges in Tackling EPTB

- Lack of awareness among physicians about EPTB's diverse manifestations.
- Difficulty in accurate diagnosis and treatment due to limited diagnostic criteria and interdisciplinary collaboration.

### TUBERCULOSIS (TB)

**Type:** Infectious disease caused by bacteria (*Mycobacterium tuberculosis*)

**Target:** Primarily attacks the lungs but can spread to other organs.

**Transmission:** Spreads through the air when an infected person coughs, sneezes, or spits.

Stages:

**Latent TB:** Person is infected but not sick and cannot spread the disease.

**Active TB:** Person develops symptoms and can spread the disease to others.

**Symptoms (Active TB):** Coughing for 3 weeks or more, Chest pain, Weight loss

**Common antibiotics used for TB treatment include:** Isoniazid (INH), Rifampin (RIF), Pyrazinamide (PZA)

### MDR-TB and XDR-TB:

- **These are types of TB where the bacteria have developed resistance to at least one and multiple first-line TB drugs, respectively.**
- Treating these strains is more complex and requires longer treatment durations (often 18 months or more) compared to regular TB.
- **The specific medications used depend on the specific drug resistance pattern of the bacteria involved.**

### MDR-TB Medications:

- **Fluoroquinolones:** These antibiotics are often used in MDR-TB regimens. Examples include Levofloxacin and Moxifloxacin.
- **Second-line injectable drugs:** These are powerful antibiotics that are typically reserved for drug-resistant cases. Examples include Kanamycin, Amikacin, and Capreomycin.
- **Other antibiotics:** Depending on the specific resistance pattern, other antibiotics like Cycloserine, Ethionamide, and Prothionamide might be used.

### XDR-TB Medications:

- **Treatment for XDR-TB is even more challenging, with limited treatment options available. The medications used often include:**

- **Bedaquiline and Pretomanid:** These are newer antibiotics specifically developed for treating MDR-TB and XDR-TB.
- **Linezolid:** Another powerful antibiotic used in some XDR-TB cases.
- **Repurposed drugs:** Some medications originally developed for other diseases may be used off-label in XDR-TB treatment, like clofazimine.

## Initiatives and Recommendations

- INDEX-TB guidelines were formulated, but comprehensive data and implementation remain lacking.
- Understanding mechanisms of EPTB spread and its interactions with organs is crucial.
- Advanced immunological tools and interdisciplinary efforts can aid in uncovering immune mechanisms and improving treatment protocols.

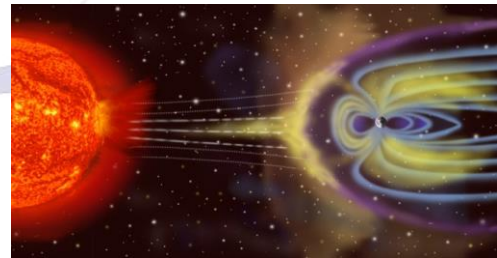
**In conclusion, EPTB poses significant challenges due to detection difficulties and lack of comprehensive protocols. Collaborative efforts and research are vital to address this overlooked aspect of TB and improve patient outcomes.**

## II. SPACE TECHNOLOGY

### 5. GEOMAGNETIC STORMS

#### SOURCE: INDIAN EXPRESS

Recently, Earth experienced the most potent geomagnetic storm in more than twenty years, resulting in radio signal disruptions and extending the occurrence of auroras, typically seen in northern regions, to as far south as the United States.



#### Geomagnetic Storms:

- **Definition:** Geomagnetic storms are disturbances in Earth's magnetosphere caused by a rapid exchange of energy from the solar wind into the space environment around Earth.
- **Causes:** These storms occur due to variations in the solar wind, particularly sustained periods of high-speed solar wind and a southward-directed solar wind magnetic field.
- **Association with CMEs:** The most significant geomagnetic storms are linked to solar coronal mass ejections (CMEs), where large amounts of plasma from the sun, along with its embedded magnetic field, impact Earth.

## Effects:

- Intense currents in the magnetosphere.
- **Changes in the radiation belts and ionosphere, leading to heating and auroras.**
- Disruption of long-range radio communication, satellite orbits, and electronics.
- **Disturbance of global navigation systems and induction of harmful currents in power grids and pipelines.**

## Solar Wind:

- **Definition:** Solar wind is a continuous stream of protons and electrons emanating from the sun's corona.
- **Characteristics:** It travels through the solar system at varying speeds and densities, typically ranging from 250 to 500 miles per second, in a plasma state.
- **Composition:** Charged particles in the solar wind carry the solar magnetic field outward from the sun.
- **Impact on Earth:** Upon reaching Earth, the solar wind interacts with Earth's magnetosphere, sending charged particles along magnetic field lines towards the poles, leading to geomagnetic storms and phenomena like auroras.

## 6. SPECULOOS-3b

### SOURCE: INDIAN EXPRESS

Astronomers detected a new Earth-sized planet named SPECULOOS-3b. It is located 55 light-years away, orbiting an ultra-cool red dwarf star.



- **Star Characteristics:** The red dwarf is similar in size to Jupiter but emits light 100 times dimmer than the Sun and has half the Sun's temperature.
- **Planet Characteristics:** SPECULOOS-3b is only the second Earth-sized planet found orbiting this type of star.
- **Radiation and Atmosphere:** The planet receives high radiation levels from its star, likely stripping away any atmosphere. It gets nearly 16 times more energy per second than Earth receives from the Sun.
- **Orbit:** SPECULOOS-3b completes an orbit around its star in about 17 hours.

- **Tidal Locking:** The planet is tidally locked, meaning the same side always faces the star, creating a permanent day side and a permanent night side.
- **Discovery Team:** The discovery was made by the SPECULOOS project, led by the University of Liège, with partners from the Universities of Birmingham, Cambridge, Bern, and MIT.
- **Observatory:** The observatory is in the Atacama Desert, Chile.
- **Project Goal:** SPECULOOS aims to find exoplanets orbiting ultra-cool dwarf stars using a global network of robotic telescopes.

## 7. SPACE TOURISM

### SOURCE: PIB

**Space tourism, once a futuristic dream, is now becoming a reality with individuals like Gopi Thotakura venturing beyond Earth's atmosphere.**

This burgeoning industry offers recreational trips to space, presenting both opportunities and challenges.



### What is Space Tourism?

Space tourism involves providing recreational space travel experiences for tourists.

- **Types:** Suborbital flights offer brief experiences of weightlessness, while orbital flights take passengers into Earth's orbit for longer durations.
- **Private Players:** Virgin Galactic and Blue Origin are prominent private companies venturing into space tourism, supported by NASA's investment in commercial space stations.

### KARMAN LINE

The Karman line, named after Theodore von Kármán, is the internationally recognized boundary of space, defined as 100 kilometers above Earth's mean sea level by the FAI. It separates Earth's atmosphere from outer space, distinguishing between aircraft and spacecraft.

### Challenges to Space Tourism:

- **Environmental Impact:** Launching spacecraft generates pollution and contributes to climate change.
- **Safety Concerns:** Mishaps during space travel pose significant risks.
- **Cost:** Accessibility remains limited due to high costs, creating concerns about inequality.



- **Space Debris:** Increased space travel leads to more debris, posing threats to spacecraft.
- **Resource Depletion:** Space tourism consumes vast resources, raising sustainability concerns.
- **Legal Issues:** Uncertainty surrounds liability and compliance with international space laws.



### Opportunities for India in Space Tourism:

- **Leveraging ISRO's Expertise:** India's successful space missions demonstrate technological prowess and potential for competitive pricing.
- **Public-Private Partnership:** Initiatives like NSIL and supportive policies attract investments and drive innovation.
- **Future Plans:** ISRO aims to develop reusable space tourism modules, making it more accessible and affordable.

### Future of Space Tourism:

- **Accessibility:** By 2030, space tourism may become accessible to the wealthy, with ISRO aiming for commercialisation in India.
- **Beyond Earth's Orbit:** Expansion into lunar and deep space exploration is envisioned, with missions to Mars and beyond.
- **Space Staycations:** Longer stays in space modules are envisioned for tourists seeking extended experiences.
- **Sustainability:** Emphasis on reusable rockets aims to reduce space debris and ensure environmental friendliness.

## 8. PLANETARY ALIGNMENT ON JUNE 3

### SOURCE: LIVEMINT

Planetary alignment occurs when planets in the solar system appear to line up from a specific viewpoint on Earth. This is an illusion of perspective, not a perfect line in space.

**Aligning Planets:** On June 3, Mercury, Mars, Jupiter, Saturn, Uranus, and Neptune will form a near-straight line.

### Visibility:

- **Visible Planets:** Mars and Saturn will be visible to the naked eye, though they will appear dim.

- **Tricky to See:** Mercury and Jupiter will be difficult to spot due to their proximity to the Sun.



### Need for Telescopes:

- Uranus and Neptune will require telescopes or high-powered binoculars to be seen.
- **Moon's Effect:** The Moon may interfere with the visibility of some planets due to its brightness.
- **Viewing Tip:** To see the alignment, observers may need to find a dark location away from city lights and use optical aids for the best view of distant planets.

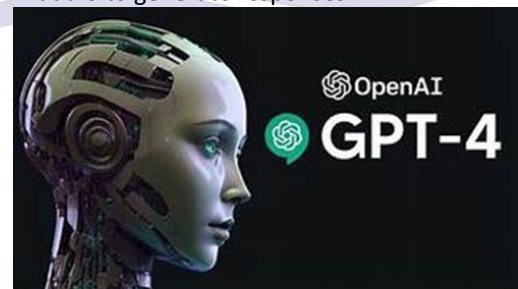
## III. EMERGING TECHNOLOGIES

### 9. OPenAI'S CHatGPT and GPT-4 Vision

#### SOURCE: INDIAN EXPRESS

OpenAI's ChatGPT has announced access to GPT-4 with Vision, Introducing GPT-4 Vision (GPT-4V):

- **Multimodal AI:** GPT-4V combines image, text, and audio inputs.
- **Visual Question Answering (VQA):** Users can upload images and ask questions about them.
- **Large Multimodal Model (LMM):** Capable of processing various modalities like text, images, and audio to generate responses.



### Key Features:

- **Visual Content Processing:** Handles photos, screenshots, and documents.
- **Object Identification:** Identifies objects in images and interprets visual data like graphs and charts.
- **Text Interpretation:** Recognizes handwritten and printed text in images, bridging visual understanding with textual analysis.

### Applications:

- **Research & Academia:** Assists in interpreting historical documents and manuscripts.

- **Web Development:** Generates website code from visual designs, including sketches.
- **Data Analysis:** Provides insights based on visual and graphic data interpretation.

## 10. LAB-GROWN DIAMONDS

### SOURCE: HINDUSTHAN TIMES

India is the world's second-largest producer of lab-grown diamonds, creating over three million annually and accounting for 15% of global production.



#### Lab-Grown Diamonds:

These diamonds have the same chemical, optical, and physical properties and crystal structure as natural diamonds, made of tightly bonded carbon atoms. They respond to light and are as hard as natural diamonds.

- **Origin Difference:** The primary difference between lab-grown and natural diamonds is their origin. Lab-grown diamonds are produced using technology that mimics natural geological processes.
- **Simulants:** Diamond simulants like Moissanite, Cubic Zirconia (CZ), White Sapphire, and YAG are used to create the appearance of natural diamonds.

#### Production Methods:

##### High Pressure, High Temperature (HPHT):

- This common and cost-effective method mimics the earth's conditions for forming natural diamonds.
- Carbon materials are crushed under pressures of over 870,000 lbs. per square inch and heated between 1300-1600°C.
- HPHT can also improve or change the color of lower-quality diamonds.

##### Chemical Vapor Deposition (CVD):

- This technique uses moderate temperatures (700°C to 1300°C) and lower pressures.
- A carbon-containing gas is pumped into a vacuum chamber, depositing onto a diamond seed and crystallizing into a lab-grown diamond.
- The diamond's size depends on the growth duration.

#### Applications:

- **Industrial Use:** Lab-grown diamonds are used in machines and tools due to their hardness and strength, making them ideal for cutting tools.

- **Electronics:** Pure synthetic diamonds are used as heat spreaders in high-power laser diodes, laser arrays, and high-power transistors.

## IV. PRELIMS POINTERS IN NEWS

### 11. MANGE OUTBREAK

#### SOURCE: INDIAN EXPRESS

Mange Outbreak in Asiatic Wild Dogs at Mudumalai Tiger Reserve

#### Understanding Mange Disease:

- **A skin disease in animals** caused by mite infestations, leading to skin inflammation, itching, thickened skin, and hair loss.
- **Causes:** The severe form is caused by the **Sarcoptes scabiei** mite, also responsible for human scabies.
- **Transmission:** Spread through **direct animal contact** or contact with contaminated objects; most forms are treatable.



#### About Asiatic Wild Dogs (Dholes):

- Also known as **Indian wild dogs, whistling dogs, red wolves, red dogs, and mountain wolves.**
- **Habitat:** Found in forests across central, south, and southeast Asia, from Siberia to Malaysian islands and the Indian peninsula.
- **Distribution in India:** Mainly seen in three clusters - **Western and Eastern Ghats, central India, and Northeast India, with Ghats being a stronghold region.**
- **Preferred Habitats:** Dense jungles, steppes, mountains, scrub forests, and pine forests.

#### CONSERVATION STATUS:

- **IUCN Red List:** Classified as 'Endangered.'
- **Wildlife Protection Act 1972:** Listed under Schedule
- **CITES:** Listed in Appendix II, highlighting the need for conservation efforts.

## 12. MEPHEDRONE

### SOURCE: INDIAN EXPRESS

The Narcotics Control Bureau (NCB) and Gujarat's Anti-Terrorism Squad (ATS) worked together to uncover hidden labs producing mephedrone in Gujarat and Rajasthan.



#### About Mephedrone:

- **Names:** Also known as 4-methylmethcathinone, 4-MMC, and 4-methylephedrone. Street names include 'drone,' 'M-CAT,' 'white magic,' 'meow meow,' and 'bubble.'
- **Classification:** It's a synthetic stimulant, belonging to the amphetamine and cathinone classes.
- **Health Effects:** Users experience increased alertness, euphoria, and sociability, but it's associated with negative effects like anxiety, paranoia, nausea, and insomnia. **Long-term use can lead to severe issues such as cardiovascular problems, hallucinations, and aggressive behavior.**
- **Legal Status:** Banned in India under the Narcotic Drugs and Psychotropic Substances Act, 1985.

**Consequences and Concerns:** Mephedrone's impact on mental and physical health raises concerns about addiction and long-term psychological harm. Its production and distribution are illegal due to its harmful effects.

## 13. OPIOIDS

### SOURCE: INDIAN EXPRESS

During a three-day visit to China, US Secretary of State Anthony Blinken addressed the issue of producing and exporting "synthetic opioid precursors," with a specific focus on the drug fentanyl.

#### About Opioids:

Opioids are a class of drugs derived from or mimicking natural substances found in the opium poppy plant. They activate opioid receptors in the brain and body, blocking pain signals and producing effects like pain relief and euphoria.

### COMMONLY USED OPIOIDS

Codeine  
Fentanyl  
Heroin  
Hydrocodone (Vicodin)  
Hydromorphone  
Methadone  
Morphine  
Oxycodone (OxyContin)  
Percocet



#### Common Examples:

- **Morphine, Heroin, Oxycodone, Codeine, and fentanyl.**

#### Effects and Addiction:

- Opioids produce **pain relief and euphoria but are highly addictive.** They can lead to overdose and death by suppressing the brain's respiratory function.

#### Opioid Overdose:

- Overdose signs include pinpoint pupils, unconsciousness, and breathing difficulties.

#### Fentanyl:

- Fentanyl is a potent synthetic opioid approved by the FDA for pain relief and anesthesia.
- **It's about 100 times more potent than morphine and 50 times more potent than heroin.**

#### Concerns:

- Illicitly produced fentanyl, often used to cut or substitute heroin, contributes to a significant portion of opioid-related overdoses due to its potency and ease of synthesis.

#### Regulation:

- Efforts are ongoing to regulate the production and distribution of fentanyl and its precursors to curb its illicit use and prevent overdoses.

## 14. GOLDENE

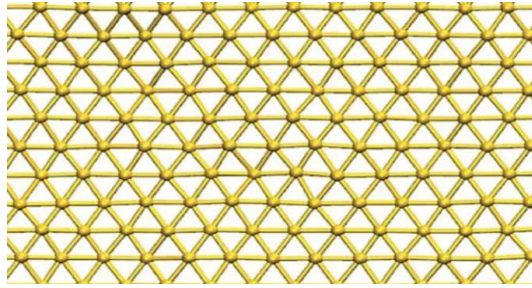
### SOURCE: TIMES OF INDIA

Goldene is the first-ever free-standing 2D metal, composed of a single atom-thick layer of gold.

#### Creation Process:

- Scientists developed **Goldene** by **sandwiching a monolayer of silicon between layers of titanium carbide.**
- They then deposited gold on top, causing the gold atoms to replace silicon atoms, forming a trapped monolayer.
- **By etching away the titanium carbide layers, they achieved a standalone, one-atom-thick sheet of gold,** using a traditional Japanese technique employing Murakami's reagent.



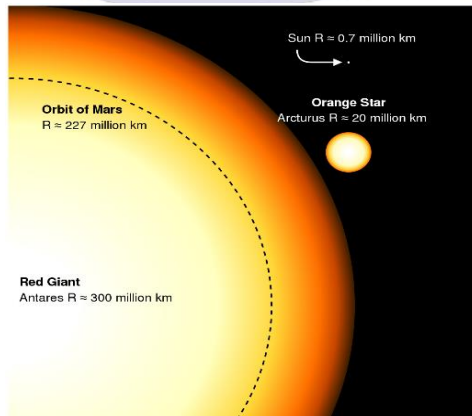


- **Thickness and Comparison:** Goldene sheets measure approximately 100 nanometers in thickness, which is roughly 400 times thinner than the thinnest commercially available gold leaf.
- **Applications in Electronics:** Goldene holds potential applications in the electronics industry due to its unique properties.
- **Catalytic Potential:** Goldene can be utilized in various catalytic processes, including carbon dioxide conversion, hydrogen generation, selective chemical production, and water purification.
- **Economic Viability:** Its ultra-thin structure makes Goldene more economically viable as a catalyst compared to thicker, three-dimensional gold materials.
- **Significance:** Goldene's development marks a significant advancement in materials science, offering new possibilities for catalysis and other industrial applications, thanks to its unprecedented thinness and unique properties.

## 15. ANTARES

### SOURCE: THE HINDU

The Indian Institute of Astrophysics (IIA), based in Bengaluru, captured footage of the moon passing in front of Antares, a prominent red star.



### About Antares:

**Antares, also known as Alpha Scorpii, is the brightest star in the Scorpius constellation and the 15th brightest in the night sky.**

Classified as a red supergiant, Antares is approximately 10,000 times brighter than the Sun.

Remarkably, it is one of the largest known stars, with a diameter 700 times that of the Sun, large enough to encompass the orbit of Mars if our solar system were centered on it.

Despite its immense size, Antares has an overall density much lower than that of the Sun.

**Despite its size, Antares is relatively cool, with a surface temperature of about 6,100 degrees Fahrenheit (3,400 degrees Celsius), which gives it its distinctive ruddy colour.** Located approximately 600 light-years away from Earth, Antares continues to intrigue astronomers with its unique characteristics.

## 16. PSYCHEDELICS

### SOURCE: INDIAN EXPRESS

Psychedelics are drugs that change perception, behavior, consciousness, and thought, often enhancing sensory awareness.



- **Origin of Term:** "Psychedelic" comes from Greek words for "mind/soul" and "manifest."
- **Effects:** These drugs can alter thoughts and perceptions, causing intense hallucinations.

### Categories:

- **Classical Psychedelics:** Trigger hallucinations by activating serotonin 5-HT receptors found throughout the body (e.g., LSD, psilocybin, DMT).
- **Nonclassical Psychedelics:** Bind to various receptors (e.g., ketamine, MDMA).

**Research:** Five psychedelics are being studied globally for mental health treatment: psilocybin, LSD, MDMA, ketamine, and DMT.

**Mechanism:** Most increase serotonin availability in the brain by binding to serotonin receptors.

**Regulation:** The UN Convention on Psychotropic Substances (1971) lists around 200 substances in four schedules, with Schedule I having the highest abuse potential. It does not specify psychedelics.

Researchers are urging for local clinical trials due to the global rise in trials and the low success rate of current mental health medications.



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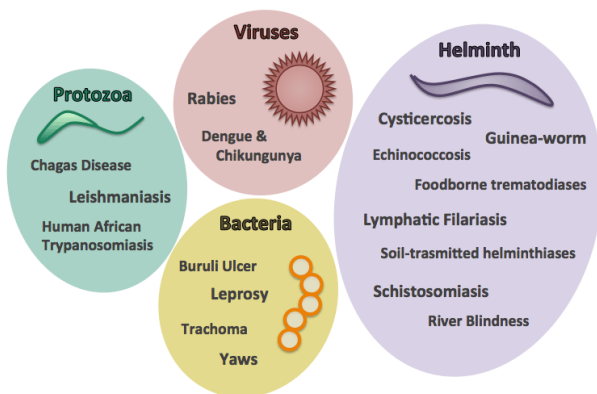
## NEGLECTED TROPICAL DISEASES

Neglected tropical diseases (NTDs) are a group of diverse conditions caused by various pathogens like viruses, bacteria, parasites, fungi, and toxins. These diseases often afflict impoverished communities in tropical regions, leading to severe health, social, and economic consequences.

### About Neglected Tropical Diseases (NTDs)

- NTDs have complex epidemiology, often linked to environmental factors. They may be vector-borne, have animal reservoirs, and involve intricate life cycles.
- **Lack of Attention and Funding:** Compared to diseases like HIV/AIDS, malaria, and tuberculosis, NTDs receive significantly less funding for research and development of treatments, leading to neglect in healthcare systems.

### Neglected Tropical Diseases



### Global and Indian Initiatives to Tackle NTDs

#### Global Initiatives:

- **WHO's Roadmap 2021-2030:** This comprehensive plan prioritizes the impact of NTD programs, encouraging collaboration across healthcare, sanitation, and communities. It aims for countries to take ownership of their NTD programs.
- **2012 London Declaration:** This international agreement acknowledges the global burden of NTDs and advocates for a unified approach to eliminate them.

#### Indian Initiatives:

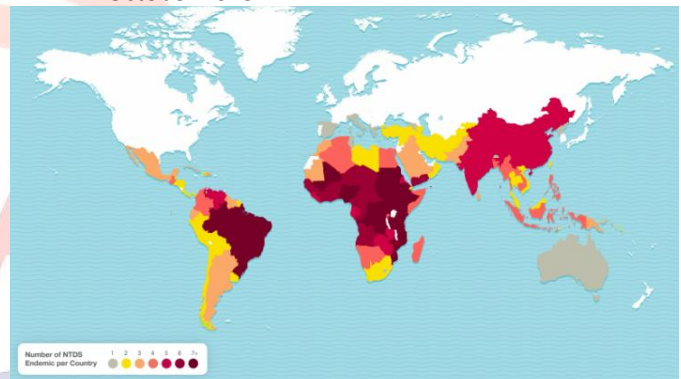
- **Elimination Programs:** India has successfully eliminated diseases like guinea worm, trachoma, and yaws. The Accelerated Plan for Elimination of Lymphatic Filariasis (APELF) targets lymphatic filariasis elimination by 2027.
- **WHO Collaborations:** India collaborates with WHO in regional alliances, such as the initiative with Bangladesh and Nepal focusing on early diagnosis and treatment of Kala-azar.
- **Mass Drug Administration (MDA):** MDA involves distributing free anti-parasitic medication in high-risk areas to prevent NTD transmission.

- **Vector Control:** Programs like Indoor Residual Spraying target insect breeding grounds to curb the spread of NTDs like Kala-azar.
- **Financial Assistance:** Wage compensation schemes aid individuals affected by NTDs, particularly those with Post-Kala Azar Dermal Leishmaniasis, in managing the financial burden of their illness.

### Key Highlights of the WHO Report on NTDs

#### Global Overview:

- **Country Eliminations:** By December 2023, 50 countries have eliminated at least one NTD, marking halfway progress towards the 2030 target of 100 countries.
- **Disease Eliminations:** Iraq became the 50th country to eliminate at least one NTD in July 2023, while Bangladesh achieved validation for eliminating visceral leishmaniasis as a public health problem in October 2023.



#### India's Status:

- **Disease Eliminations:** India has been certified free of NTDs like dracunculiasis and yaws.
- **Treatment Challenges:** Despite progress, India treated about 117 million fewer people for lymphatic filariasis and soil-transmitted helminthiasis in 2022 compared to 2021, indicating ongoing challenges.
- **Population Need:** Around 40.56% of India's population needed interventions against NTDs in 2022.

#### Challenges Highlighted in the Report

- **Post-COVID-19 Recovery:** Slow recovery post-pandemic, poses challenges to NTD elimination efforts.
- **Funding Uncertainties:** Insufficient funding remains a significant obstacle in combating NTDs effectively.
- **Geopolitical Disruptions:** Political instabilities and disruptions hinder NTD programs in some regions.
- **Climate Change:** Environmental shifts impact the prevalence and distribution of NTDs, requiring adaptive strategies.





- **Knowledge and Tools Gap:** Gaps in knowledge and tools hinder effective prevention, diagnosis, and treatment of NTDs.
- **Insufficient Data:** Lack of comprehensive data impedes targeted interventions and progress assessment in addressing NTDs.

### Conclusion

The WHO's 2024 report on neglected tropical diseases highlights progress made globally, with several countries achieving disease eliminations.

**However, challenges like funding gaps, post-COVID-19 recovery, and geopolitical disruptions threaten further progress.**

**Enhanced national and global collaboration is crucial for achieving the goal of a world free from neglected tropical diseases.**

### UPSC MAINS QUESTION

Q. "How do neglected tropical diseases (NTDs) impact impoverished communities in tropical regions, and what are the global and Indian initiatives aimed at tackling these challenges?" (150 WORDS)

## SECURITY

### I. BORDER DISPUTES

#### 1. NAGA INSURGENCY

##### SOURCE: TIMES OF INDIA

The Northeastern region of India has been grappling with various ethnic and insurgent conflicts, notably the Naga insurgency and the conflict in Manipur.

These conflicts have deep historical roots and complex dynamics, often driven by issues of identity, territory, and autonomy.

##### Naga Insurgency:

##### Historical Background:

- Nagas are an indigenous community residing in northeastern India and parts of Myanmar.
- Under British rule, Nagas assisted the British forces during World War II.
- The Naga National Council (NNC) was formed in 1946, demanding sovereignty over Naga territories.
- NNC took up arms in the 1950s, leading to the formation of the Naga Federal Government (NFG) and Naga Federal Army (NFA).



##### Key Issues:

- **Demand for Greater Nagalim:** Nagas seek to unite all Naga-inhabited areas in the Northeast under one administrative jurisdiction.
- **Sovereignty and Identity:** Nagas aspire for a separate Naga constitution and national flag.

##### Peace Initiatives:

- **Shillong Accord (1975):** Attempted to bring peace by disarming NNC, leading to factional splits.
- **Ceasefire Agreement (1997):** NSCN-IM signed a ceasefire with the government.
- **Framework Agreement (2015):** Recognized Naga history and aspirations, paving the way for negotiations.

##### Conflict in Manipur:

##### Historical Context:

- Manipur has a diverse ethnic landscape, with Meiteis in the valley and various tribal groups in the hills.

- The Kangleipak kingdom faced raids from Naga tribes, leading to the British bringing Kuki-Zomi tribes as a buffer.
- Ethnic tensions between Meiteis and hill tribes intensified during the Naga insurgency.

##### Recent Issues:

- **Delimitation Disputes:** Ethnic groups contest Census figures and political representation.
- **Refugee Crisis:** Myanmar's political turmoil led to an influx of migrants, exacerbating tensions.
- **Land Disputes:** Evictions and land encroachments trigger violence, as seen in the Churachandpur-Khoupum area.

##### Militant Involvement:

- **NSCN-IM Connection:** Alleged support to Meitei insurgent groups by NSCN-IM, exacerbating ethnic conflict.
- **People's Liberation Army (PLA):** One of the banned Meitei insurgent groups involved in armed struggle for secession.

##### Way Forward:

##### Policy Recommendations:

- **Review ST Status:** Assess criteria for Meitei Scheduled Tribe status based on recommendations from expert committees.
- **Border Surveillance:** Enhance monitoring to prevent infiltration of migrants from Myanmar.
- **Diplomatic Engagement:** Strengthen economic and diplomatic ties with neighbouring nations for regional stability.
- **Conflict Resolution:** Preserve identity and negotiate peace agreements with insurgent groups to ensure stability.
- **AFSPA Review:** Regularly review and implement confidence-building measures along with the Armed Forces Special Powers Act.
- **Community Involvement:** Encourage local participation in decision-making processes for fostering ownership and connection.

### II. CYBERSECURITY

#### 2. THE WORLD CYBERCRIME INDEX

##### SOURCE: TIMES OF INDIA

The World Cybercrime Index ranks countries based on cybercrime vulnerability, revealing global disparities in cyber threats.

##### Development and Collaboration:

- **Developed by a collaboration between the University of Oxford and UNSW Canberra.**
- Data collected from a survey of 92 global cybercrime experts involved in intelligence and investigations.



### Objective:

- Aims to identify major cybercrime hotspots globally.
- Ranks approximately 100 countries based on categories like ransomware, credit card theft, and scams.

### Key Insights

- **Global Distribution:** Cybercrime threats vary across countries and are not evenly distributed.
- **Top Hotspots:** Russia leads the index, followed by Ukraine, China, the USA, Nigeria, and Romania.
- **Country-Specific Cybercrimes:**
- USA linked with data and identity theft.
- China often associated with cybercrimes related to technical products/services.

### Economic Impact:

- Cybercrime is estimated to cost the global economy around \$9.22 trillion in 2024.
- Expected to rise to \$13.82 trillion by 2028.

## III. PRELIMS POINTERS IN NEWS

### 3. SUPERSONIC MISSILE-ASSISTED RELEASE OF TORPEDO (SMART) SYSTEM

#### SOURCE: PIB

The Defence Research and Development Organisation (DRDO) successfully tested the Supersonic Missile-Assisted Release of Torpedo (SMART) system.



#### About SMART system:

- Developed by DRDO, the system was launched from a ground mobile launcher off the coast of Odisha, India.
- The SMART system enables the launch of lightweight torpedoes targeting submarines at distances beyond conventional ranges.

- It is designed for immediate action upon detecting enemy submarines, particularly in situations where other assets are unavailable.
- The canister-based missile system incorporates advanced subsystems including two-stage solid propulsion and precision inertial navigation.
- It carries an advanced lightweight torpedo missile as a payload, equipped with a parachute-based release mechanism.
- The test validated several state-of-the-art mechanisms such as symmetric separation, ejection, and velocity control.
- Overall, the SMART system enhances India's defence capabilities by providing an effective means to target submarines from significant distances, contributing to maritime security and defence readiness.

### 4. HIGH MOBILITY ARTILLERY ROCKET SYSTEMS (HIMARS)

#### SOURCE: INDIAN EXPRESS

HIMARS is a light, multiple rocket launcher system designed to engage and defeat various targets, including artillery, air defense concentrations, vehicles, and personnel carriers.

- Manufactured by Lockheed Martin Corporation, a US-based security and aerospace company, HIMARS is a versatile weapon system utilized for military operations.



#### Features:

- **Air-Transportable:** Mounted on a 5-ton Family of Medium Tactical Vehicles (FMTV), HIMARS is air-transportable and can be swiftly deployed to different locations.
- **Launcher Options:** It can carry either a launcher pod of six rockets or one MGM-140 Army Tactical Missile System (ATACMS), providing flexibility in its weaponry.
- **Rapid Deployment:** HIMARS can be prepared for firing in less than 20 seconds, and a full launcher load of six rockets can be fired within 45 seconds, allowing for quick response to threats.



- **Mobility and Protection:** The system launches its weapons and swiftly moves away from the launch site to evade detection by enemy forces. Additionally, it is equipped with the Increased Crew Protection cabin to safeguard the operating crew against various hazards.

## 5. LAKSHYA AIRCRAFT

### SOURCE: INDIAN EXPRESS

The Lakshya aircraft is a pilot-less target aircraft developed by the Aeronautical Development Establishment (ADE) in Bengaluru, part of DRDO, to assist the Indian Armed Forces in their training and evaluation of new weapon systems.



- **Induction and Usage:** It was introduced into the Indian Air Force, Indian Navy, and Indian Army in 2000, 2001, and 2003 respectively.
- **Design Features:** Lakshya is a reusable, high subsonic aerial target system powered by a gas turbine engine.
- **Target System:** It carries two tow targets, each 1.5 km long, with radar, infrared (IR), or visual signature augmentation, and a Miss Distance Indication Scoring System.
- **Training Use:** These tow targets are used for training land- or ship-based gun and missile crews, as well as combat aircraft pilots, in weapon engagement tactics.
- **Launch and Recovery:** Lakshya can be launched from both land and sea using a zero-length launcher and recovered via a dual-stage parachute system.
- **Control System:** It can be controlled from the ground control station (GCS) using pre-programmed hardware and software systems.
- **Reusability and Mission Capability:** Designed for 15 missions, Lakshya aids in neutralizing incoming airborne enemy targets.

## 6. NAVAL NAMES TO SHED COLONIAL LEGACY

### SOURCE: THE HINDU

The Indian Navy's recent initiatives to rename traditional naval symbols and introduce new insignias reflect a broader effort to shed colonial legacies and redefine its identity in alignment with India's national heritage and aspirations.

### Recent Changes in Nomenclature

#### New Nomenclature:

- The Indian Navy has renamed 'Jack' to 'National Flag' and 'Jackstaff' to 'National Flag Staff' to indigenize and reflect national pride.

#### Origins of Old Terms:

- 'Jack' and 'Jackstaff' are rooted in British naval history and have been adopted globally, including in India, as remnants of British naval practices.
- 'Jack' traditionally refers to a flag, and the 'Jackstaff' is the pole from which this flag is flown, typically positioned at the bow of a ship.

#### Regulatory Framework and Legal Amendments:

- The change in nomenclature was formalized through an amendment to the "Regulations for the Navy (Ceremonial, Conditions and Service and Miscellaneous Regulation) 1963," utilizing powers granted by the Naval Act of 1957.

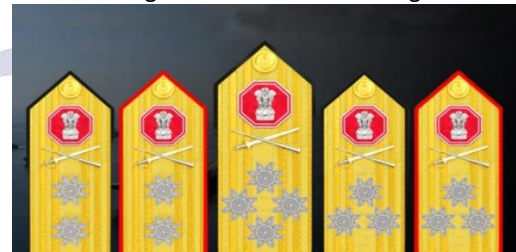
#### Other Symbolic Changes Across the Armed Forces

##### Changes in Naval Insignia:

- The Indian Navy adopted a new naval ensign in September 2022, replacing the British-inspired George's Cross with a design featuring a blue octagon, twin golden borders, the national emblem, and the motto 'Satyamev Jayate'.
- This insignia draws inspiration from the seal of Shivaji Maharaj, symbolizing the Navy's reach in all eight directions.

##### Change in Epulettes of Naval Officers:

- New senior officers' epulettes, inspired by Chhatrapati Shivaji Maharaj's seal, were unveiled, symbolizing a break from colonial legacies and celebrating India's maritime heritage.



##### New Dress Code in Messes:

- The Indian Navy introduced the Kurta-Pyjama in naval messes, embracing its heritage, with senior officers among the first to adopt the traditional attire.

##### Changes in Indian Army:

- The Indian Army is phasing out traditional practices like horse-drawn buggies at events and retirement ceremonies, along with pipe bands at dinners.

##### Significance

##### Shedding Colonial Ties:

- Renaming and redesigning naval symbols signify a departure from colonial influences and reaffirm India's sovereignty and maritime heritage.




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## Alignment with National Aspirations:

- These initiatives align with the Prime Minister's "Panch Pran" pledges, emphasizing the nation's development and assertion of independence by its 100th year of independence.



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## SOCIETY

### I. VULNERABLE SECTIONS OF THE SOCIETY

#### 1. SELF HELP GROUPS

The Kudumbashree mission in Kerala, a self-help group (SHG), recently celebrated its 26th anniversary.

Established in 1998, Kudumbashree has grown to include 46.16 lakh members across three lakh neighbourhood groups.

Initially focused on women's enterprises, Kudumbashree now offers legal aid, counselling, loans, cultural engagements, and participates in disaster relief efforts.

This milestone highlights the significant role SHGs play in socio-economic development.

#### What are Self Help Groups (SHGs)?

A Self-Help Group is a self-governed, peer-controlled group of people with similar socio-economic backgrounds aiming to achieve a common purpose.

- **Membership:** Typically consists of 5 to 20 members with similar economic outlooks and social status.

#### Origins of SHGs in India

- **Early Efforts (Pre-1970s):** Informal SHGs, particularly among women, existed for collective action and mutual support.
- **SEWA (1972):** The Self-Employed Women's Association (SEWA), founded by Ela Bhatt, organized poor and self-employed women workers, providing a platform for income generation and advocacy.
- **MYRADA and Pilot Programs (Mid-1980s):** The Mysore Resettlement and Area Development Agencies (MYRADA) pioneered SHGs as a microfinance strategy to provide credit to the poor, especially women in rural areas.
- **NABARD and SHG-Bank Linkage (1992):** The National Bank for Agriculture and Rural Development (NABARD) launched the SHG-Bank Linkage Programme, connecting SHGs with formal banking institutions for access to credit and financial services.
- **Government Recognition (1990s-Present):** Various government schemes like Swarn Jayanti Gram Swarozgar Yojana (SGSY) and the National Rural Livelihoods Mission (NRLM) have expanded the reach and impact of SHGs in India.

#### Government Initiatives and Policies Supporting SHGs

##### Deen Dayal Antyodaya Yojana

- National Rural Livelihoods Mission (DAY-NRLM)
- Aims to alleviate rural poverty and create sustainable livelihood opportunities through SHGs.

#### SHG-Bank Linkage Programme (SBLP)

- Connects SHGs with formal banking institutions to provide them with credit and financial services.

#### Mission for Financial Inclusion (MFI)

- Promotes financial inclusion by enabling SHGs to access formal financial services.

#### Impact of SHGs on Women

##### Economic Empowerment

- **Access to Microfinance and Credit:** SHGs provide women with access to affordable financial services.
- **Income Generation:** Facilitates income-generating activities and entrepreneurship among women.
- **Poverty Alleviation:** Plays a crucial role in reducing poverty by increasing economic stability for women and their families.

##### Women's Agency and Empowerment

- **Leadership and Assertiveness:** SHGs offer training that empowers women to challenge traditional gender norms and assume leadership roles.
- **Decision-Making Power:** Increases women's influence in family and community decisions.

##### Impact on Family and Society

- **Equitable Relationships:** Empowers women with greater respect and decision-making power, fostering more equitable family relationships.
- **Local Governance:** Increases women's representation and leadership roles in local governance.
- **Social Issues:** Addresses issues like domestic violence by economically empowering women and providing a supportive network.

#### Challenges and Limitations Faced by SHGs

##### Sustainability of SHG Initiatives

- **Long-Term Viability:** Requires continued external support, effective internal management, strong leadership, community support, and revenue generation.

##### Dependency and Overreliance on External Aid

- **Self-Sustainability:** SHGs face challenges due to dependency on external aid, affecting their long-term viability, especially in disaster-affected areas.

##### Addressing Intersectional Challenges

- **Inclusivity:** SHGs often encounter caste, class, and regional challenges, impacting their effectiveness and inclusivity. Marginalised groups typically receive fewer benefits.

##### Agricultural Activities

- **Focus:** Most SHGs operate at the local level, primarily engaged in agricultural activities. Introducing non-agricultural businesses and state-of-the-art machinery is essential for diversification.





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## Lack of Technology

- **Technological Adoption:** Many SHGs use rudimentary or no technology in their operations, limiting efficiency and scalability.

## Market Access

- **Marketplace Integration:** Goods produced by SHGs often lack access to larger marketplaces, affecting income potential.

## Poor Infrastructure

- **Connectivity:** SHGs are typically located in rural and remote areas with poor connectivity and limited access to electricity.

## Politicisation

- **Political Interference:** Political affiliation and interference can lead to group conflicts, affecting SHG operations and cohesion.

## Way Forward

### Leveraging Technology for Scale and Efficiency

- **Digital Platforms:** Technology can enhance SHG operations through improved record-keeping, financial transactions, and communication. Initiatives like NABARD's E-Shakti project demonstrate the potential benefits.

### Strengthening Linkages with Formal Financial Institutions

- **Financial Inclusion:** Linking SHGs with formal financial institutions through programs like SBLP enhances sustainability, reduces reliance on informal lenders, and promotes financial inclusion.

### Integrating Environmental Sustainability into SHG Activities

- **Sustainable Practices:** Incorporating environmental sustainability into SHG activities enhances resilience and promotes broader sustainable development goals.

### Awareness for Inclusivity

- **Equitable Participation:** Encourage SHGs to adopt inclusive approaches, considering members' socio-economic backgrounds for equitable participation and benefit-sharing, addressing discrimination concerns.



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## HEALTHIER LIFESTYLE

The Indian Council of Medical Research (ICMR) and the National Institute of Nutrition (NIN) have released guidelines stressing the significance of reading food labels for maintaining health and avoiding deceptive claims on packaged foods.

### Key Recommendations for a Healthier Lifestyle

- **Moderation in Consumption:** Recommends moderate use of oil and fats while reducing salt and sugar intake to prevent diseases like coronary heart disease and type 2 diabetes.
- **Exercise and Physical Activity:** Emphasizes regular physical activity alongside a balanced diet to combat issues like obesity.
- **Dietary Diversity and Nutrient Intake:** Suggests sourcing macronutrients and micronutrients from at least eight food groups to ensure a balanced diet and prevent deficiencies.
- **Limiting Ultra-Processed Foods:** Highlights the importance of limiting consumption of ultra-processed foods high in sugar, salt, and fat to avoid health issues.
- **Informed Food Choices:** Urges consumers to read food labels to make healthy choices and avoid foods high in sugars, fats, and salts.
- **Avoid Protein Supplements:** Discourages the use of protein supplements due to potential health risks.



### Benefits of Following Guidelines for Different Population Groups

- **Pregnant Women and New Mothers:** Supports overall health for mother and baby, reducing the risk of complications.
- **Infants and Young Children:** Promotes exclusive breastfeeding and introduces complementary foods for optimal development.
- **Children and Adolescents:** Supports learning, growth, and physical activity for optimal development.
- **Elderly People:** Addresses specific needs like bone health and immune function, improving quality of life.

### Misleading Aspects of Packaged Foods

- **Attention-Grabbing Labels:** Often designed to suggest health benefits, leading to consumer confusion.
- **'Natural' Claims:** Misleading labeling can misinform consumers about the actual content of processed foods.
- **Packaged Juice Labels:** May not accurately represent the fruit content, leading to misconceptions.
- **Fruit Ripening:** Use of harmful substances for fruit ripening poses health risks.



### Food Processing Sector in India:

#### Status of India's Food Processing Industry:

- **Growth Potential:** Considered a promising sector in India with abundant investment opportunities.
- **Government Support:** Ministry of Food Processing Industries (MoFPI) actively promotes the sector.
- **Initiatives:** Programs like Pradhan Mantri Kisan Sampada Yojana (PMKSY), Pradhan Mantri Formalisation of Micro Food Processing Enterprises Scheme (PMFME), and PLI Scheme are aimed at fostering growth.
- **Investment Environment:** Most food processing sectors allow 100% Foreign Direct Investment (FDI) under the automatic route, encouraging foreign investors.
- **Positive Indicators:** Exports in food processing grew by 13% to USD 19.69 Bn in FY 2022-23, and total FDI inflow reached USD 12.46 Bn by Dec 2023.
- **Projected Growth:** The Indian food processing market is expected to reach USD 535 Bn by 2025, growing at a CAGR of 15.2%.

#### India's Efforts to Promote Healthy Eating:

- **PM Poshan SHakti Nirman (PM-POSHAN):** Aims to improve nutrition outcomes across the country.
- **Poshan Abhiyaan:** Also known as the National Nutrition Mission, focuses on addressing malnutrition and promoting healthy eating habits.
- **Integrated Child Development Services (ICDS) Scheme:** Provides nutrition and health services to



pregnant women, lactating mothers, and children under six years of age.

- **Eat Right Movement:** Encourages citizens to adopt healthy eating practices and make informed food choices.
- **Eat Right Mela and Awards:** Events and awards ceremonies organized to recognize and promote initiatives promoting healthy eating and nutrition awareness.

#### Way Forward

- **Standardisation of Terminology:** Clear definitions and standardized use of terms can avoid ambiguity.
- **Nutritional Literacy:** Incorporating nutritional education into school curricula can promote informed food choices.
- **Taxation and Subsidies:** Taxation on unhealthy foods and subsidies for nutritious options can encourage healthier eating habits.
- **Mobile Applications:** Developing apps to scan product labels and provide nutritional information can empower consumers.
- **Meal Planning Tools:** Providing evidence-based dietary guidelines and meal planning resources can promote healthier diets.
- **Health Policies:** Supporting local markets and kitchen gardens can enhance access to fresh produce and support healthier eating habits.

#### UPSC MAINS QUESTION

Q. "Discuss the significance of food labelling and its impact on public health."



## I. TELANGANA

### 1. SOILS OF TELANGANA

Telangana, a state situated on the Deccan Plateau in southern India, boasts a diverse range of soil types that play a vital role in its agriculture and economy.

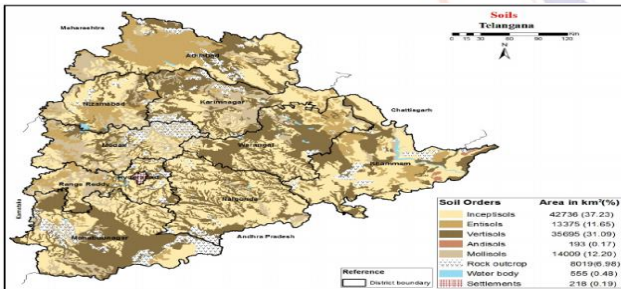
The state, which was carved out of Andhra Pradesh in 2014, encompasses an area of approximately 112,077 square kilometers and is characterized by a varied topography that includes hills, plateaus, and river valleys.

- The climatic conditions in Telangana range from **semi-arid to arid**, with significant variations in rainfall patterns across different regions.
- This climatic diversity, along with the underlying geology, has contributed to the formation of distinct soil types.
- The soils of Telangana are **Suitable for wide range of crops including food grains, oil seeds, pulses, pastures, and forestry, etc.**
- The soils allow the planting of a variety of fruits and crops such as mangoes, Oranges, coconut and flower crops.

### CLASSIFICATION OF SOIL IN TELANGANA

The soils in Telangana can be broadly classified into four categories. These are:

- Red soil
- Black soil
- Alluvial soil
- Laterite soil



#### RED SOILS

Red soils occupy 48% of the total area in Telangana.

These soils are mostly formed due to crystalline granite and metamorphic rocks such as gneisses and schists.

The colour of this soil is **red to yellowish** because of the **coatings of ferric oxides around the soil particles.**

- Some of the characteristics of these soils includes having a **low Cation Exchange Capacity (CEC), high phosphorus fixing capacity and low presence of nitrogen, phosphorus, calcium, zinc, and sulphur.**
- These soils are usually less fertile and are spread over Southern Telangana.
- Some of the major crops grown on the red soils are **corn, peanuts, lentils, peas, green gram, sorghum, castor, etc.**

- These soils are found mainly in the districts of Jagial, Medak, Medchal, Wanaparthy, Nagarkurnool, Siddipet, Jangaon, Rajanna Sircilla, Nalgonda, Suryapet, Khammam, Warangal and Hanumakonda.
- Red soils are divided into Red sandy soils and Red clay soils in Telangana which are as follows

#### 1. Red Clay Soils

- These soils are known as **Dubba soils.**
- These soils are high in clay content and low in percentage of sand mixtures.
- These soils are **very less fertile and grey in colour.**
- These soils spread over the areas of Hyderabad and Medak district.
- Among the Red soils, **47% are Dubba soils in the state.**

#### 2. Red Sandy Soils

- These soils are known as **Chalka soils.**
- These soils are formed from the weathering of igneous rocks and metamorphic rocks such as granite and gneiss.
- These soils are **high in thin sand mixture and low in percentage of nitrogen and phosphorus due to low percentage of clay.**
- These soils are spread over the districts of Mahabubnagar, Nagarkurnool, Wanaparthy, Jogulamba Gadwal, Hyderabad, Medak, Sangareddy, Siddipet, Karimnagar, Jagtial, Peddapalli, Rajanna Sircilla, Warangal, Jangaon, Nalgonda, Suryapet and Jayashankar Bhupalpally.
- About **44% of the soil in Telangana is Chalka soil.**

#### BLACK SOIL

Black soils occupy the **second position and covers 25% of the total area in Telangana.**

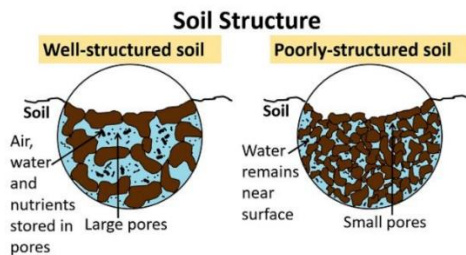
The depth of these soils depends upon the type of rocks on which these are formed.

This soil is **moderately shallow to moderately deep and developed on the gneisses and schists rocks.** The soils deep to very deep are developed from basalt rocks.

- The principal parent material of the black soils is calcareous clay in nature which has a high proportion of Calcium Carbonate.
- These soils are known as the **self-ploughing soil because of its property of holding moisture and getting swelled up.**
- The weathered product of the parent rock is basic and rich in clays, that is predominately of smectite (pure clay mineral phase) type.
- The **clay particles are very fine and do not adequately allow water to pass through it** so this kind of soil has a low permeability.

**Black soils are called as Regur soils and internationally known as Tropical Chernozems.**

- Black soils shrink up during the dry seasons to the extent that cracks develop in the fields. This shrinkage property imparts high bulk density to the soil.
- These soils are slightly alkaline in nature with a pH value ranging from 7.8 to 8.7 and it can reach upto 9.4.
- Black soils lack in some essential micronutrients such as carbon, nitrogen, sulphur and phosphorus.
- Furthermore, these soils have good water holding capacity due to their dark colour which allows them to absorb more moisture as compared to other soils.
- The fertile black cotton soil mainly forms 9% and occurs on the banks of Krishna River and in some isolated patches in Adilabad district.
- Nizamabad district consists of 52% of the total area Covered by black soil.
- The black soil in Khammam district is almost covered by 29% and it is mainly in Madhira mandal.
- Some of the major crops grown on the black soils are cotton, tobacco, chillies, jowar, etc.



## CATEGORIES OF BLACK SOILS AND THEIR LOCATION

Type of Black Soil	Location
<b>Deep black soils</b>	Adilabad, Kumuram Bheem Asifabad, Mancherial, Peddapalli, Nirmal, Rajanna, Sircilla, Hanumakonda, Jangaon, Khammam, Mahabubabad. Karimnagar, Jagtial, Bhadradi Kothagudem
<b>Mediated black soils</b>	Nizamabad, Kamareddy, Medak, Sangareddy, Siddipet, Rangareddy, Medchal, Mahabubnagar, Nagarkurnool, Wanaparthy, Jogulamba Gadwal

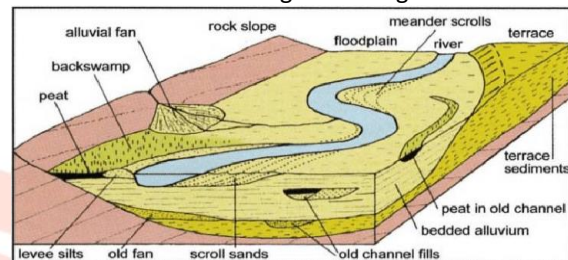
**Unclassified black soils**

South Nalgonda and Nagarkurnool

## ALLUVIAL SOIL

Alluvial soils occupy the third position and covers 20% of the total area in Telangana. These soils are known as the best soils for agriculture and are mainly developed from riverine deposits.

- Alluvial soils are known as **Khadar** in the state.
- Some of the characteristics of these soils include having rich content of phosphorus and calcium but low content of nitrogen and organic carbon.



- The colour of these soils vary and depends upon the parent rock material from which the soil is formed.
- The geomorphic condition of the area determines the depth of these soils.

**Alluvial soils are slightly alkaline but can also be acidic in areas of high rainfall. The parent material of these soils is mainly calcareous in nature.**

- These soils are in the catchment areas of Godavari, Krishna and Pranahita rivers.
- Some of the crops grown on alluvial soil are paddy sugarcane, wheat maize, mango, and banana.

## LATERITE SOIL

Laterite soils occupy 7% of the area in Telangana.

These soils are deeply weathered soils and the depth of weathering may extend upto several meters.

- Laterite soils are also known as **Red Rocky Soils**. These soils are less fertile.
- These soils are formed due to intense leaching where high temperature and high rainfall occur.



The Laterite Soil

Laterite soil is rich in aluminium and iron, formed in wet and hot tropical areas.

It is made out of decomposition as it is found in black soil regions having heavy rainfall.

It is red in color as it is mixed with iron oxides.

- These soils are high in percentage of clay content, due to in situ alteration of weathering minerals.
- These soils are highly acidic in nature and this acidic character is imparted due to leaching. This causes loss of bases (Ca, Mg, Na, K) and silica with an accumulation of sesquioxides in this soil.
- Kaolinite is the dominant clay in this kind of soil. The pH of these soils ranges from 6.0 to 6.8.
- These soils are red in colour and this reddish colour decreases with increasing depth and increase in PH values.
- Some of the crops grown on the laterite soils are ginger, turmeric, potato, etc. and laterite soils are also suitable for horticulture i.e., coffee, tea, latex, and cashew nuts.
- Red laterite soils are predominant in Zaheerabad and Narayankhed mandal of Sangareddy district.

## AGRO-CLIMATIC ZONES IN TELANGANA

Telangana is divided into three Agro-climatic zones on the basis of nature of soils which are as follows:

1. **Northern Telangana Zone** - There are 16 types of soils in this zone. The predominant soil is shallow black soils (18.4%) followed by deep calcareous soils (16.6%) and red clayey soils (15.2%).
2. **Central Telangana Zone** - There are 19 types of soils in central Telangana zone. The red type of soil covers 54% of this zone, followed by calcareous soils (13%), colluvial soils (8%) and black soils (6%).
3. **Southern Telangana Zone** - There are 19 types of soils in this zone. This zone is dominated by different textured red soils with varied depths which forms 54.8%, followed by alluvio-colluvial soils and calcareous soils (11.2%).

### Soil Erosion in Telangana

Soil erosion is a gradual process of denudation or wearing away of the upper layer of soil. It occurs when the impact of water or wind detaches and removes soil particles, causing the soil to deteriorate.

Soil deterioration and low water quality due to erosion and surface runoff are serious problems faced by the world.

Soil erosion is recognised as a significant problem for agriculture in India. **Telangana is one of the most affected states in India due to soil erosion, with about 26% of total geographical area degraded due to soil erosion.**

## SOIL CONSERVATION IN TELANGANA

Soil conservation is the prevention of soil from erosion or reduced fertility caused by overuse, acidification, salinisation or other chemical soil contamination.

Methods such as contour tillage, construction of check cultivation, controlled grazing, mixed cropping, mixed be undertaken by both the government and local dams, terrace farming, afforestation, ban on shifting farming, rotation of

crops and mulching, etc. can communities to prevent erosion and improve soil quality.

The Institution National Academy of Agricultural Research Management (NAARM) is working for soil conservation, which is situated near Rajendra Nagar mandal in Hyderabad city of Telangana.

## 2. CLIMATE OF TELANGANA

Telangana state lies in a semi-arid area and has a mostly hot and dry climate.

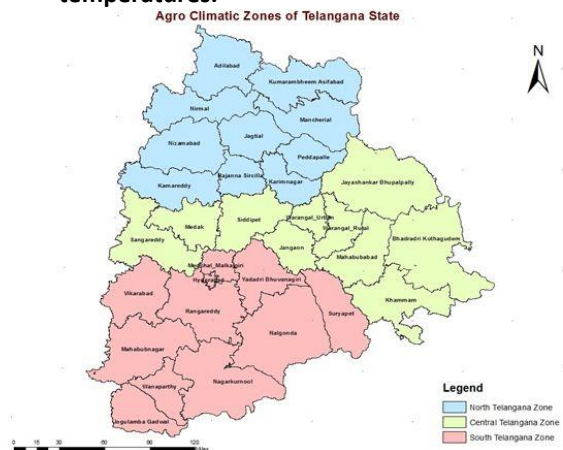
The state Telangana, which is not affected by the sea, experiences high temperature and high cold.

- The climate of the state is similar to the monsoon climate of India.
- The state falls under AW climatic type of Koppen's classification i.e., semi-arid or subhumid type with hot summers and very short winters.

## TEMPERATURE

The state experiences highest temperature in the month of May (40.6°C) and the lowest temperature in the month of December (30.8° C).

- According to Weather and Climatology of Telangana 2022, the average annual maximum temperature recorded in the state is 34.0°C.
- The average annual minimum temperature recorded in the state is 21.6°C.
- The state has eight meteorological stations, where the temperatures are recorded representing the total 33 districts of the state.
- Peddapalli district has the station at Ramagundam. The districts of Khammam, Warangal, Nalgonda, Mahabubnagar, Hyderabad, Medak and Nizamabad have stations at their respective district headquarters.
- The districts Adilabad, Rangareddy, Kumuram Bheem Asifabad, Nirmal, Mancheril and Medchal Malkajgiri do not have the stations to record temperatures.





## SEASONS IN TELANGANA

On the basis of rainfall and temperature, the state experiences three seasons which are as follows:

1. Summer season
2. Monsoon season
3. Winter season

### SUMMER SEASON

The summer season starts from March and remains till the month of May.

- The highest temperatures during the summers are recorded in the month of May during 2nd and 3rd week.
- The summer season is categorised by high temperatures, occasional rainfall and thundershowers during the evening.
- These thundershowers are useful for the mango ripening and it is also known as the **Mango Shower Rains**.
- As per Weather and Climatology of Telangana 2022, during the summer season, temperatures are maximum in the districts of Jayashankar, Jagtial (39.5°C) followed by Mancherial, Nirmal, Mulugu and Peddapalli (39.4°C) in the state.
- The **minimum temperatures in the season are recorded in the districts of Rangareddy (23.1°C) and Vikarabad (23.2°C)**

### MONSOON SEASON

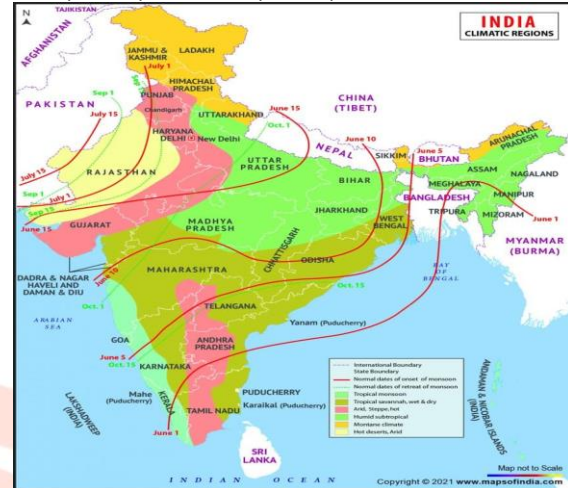
The monsoon season starts from June and continues till the month of September. The monsoon season is broadly classified as follows:

#### 1. South-West Monsoon Season

- It starts from the first week of June and lasts until second week of October.
- The monsoon rain begins in the second week of June with the onset of South-West monsoon and covers the entire state by the end of June.
- As per Weather and Climatology of Telangana 2022, the **maximum temperature** during South-East monsoon is recorded in the districts of **Khammam (34.6C) followed by Nalgonda and Suryapet district (34.5C) in the state.**
- The minimum temperature in the season is recorded in the districts of Vikarabad (22.7°C) followed by Sangareddy and Rangareddy districts (23.1°C).
- **About 80% of the annual rainfall in Telangana is received through South-West monsoon.**
- According to Telangana State Statistical Abstract 2022, the state receives annual rainfall of 739.1 mm (80.4%) during South-West monsoon season.
- **The highest rainfall** during South-West monsoon is recorded in the districts of **Mulugu (1146.1 mm)**

followed by Kumuram Bheem Asifabad (1025.8 mm).

- The highest contribution to the South-West monsoon rainfall is coming from the month of July (24.9%) followed by August (23.7%), September (17.7%) and June (14.1%).



#### 2. North-East Monsoon Season

- It starts from the month of October. The North-East monsoon is responsible for the winter rains in the state and is also known as the Winter monsoon season.
- It is a month of retreating monsoon, so the rainfall received in this season is very less in the state.
- According to Telangana State Statistical Abstract 2022, the **State receives annual rainfall of 113.2 mn (12.296) during North-East monsoon season.**
- According to Weather and Climatology of Telangana 2022, the **maximum temperature** during North-East monsoon is recorded in the districts of **Khammam (33.3°C) followed by Bhadradi Kothagudem (33.0°C) in the State.**
- The **minimum temperatures** in the season are recorded in the districts of **Adilabad (17.0°C) and followed by Rajanna Sircilla (17.2°C).**
- The rainfall during the North-East monsoon season is highest in Khammam (142.9mm) followed by Hyderabad (140.9mm).

### RAINFALL IN TELANGANA

The annual rainfall has a large variability across the districts in Telangana.

According to Telangana State Statistical Abstract 2022, the **annual average rainfall in Telangana is 906.3 mm**. The highest rainfall occurs in July at 244.4 mm and the lowest rainfall occurs in December at 5.5 mm.

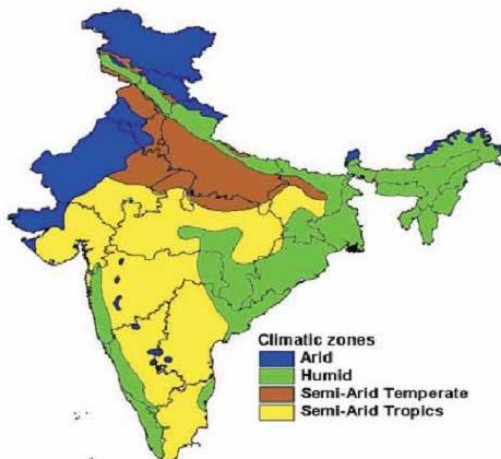
- **Bhadradi Kothagudem (1194.2mm) receives the highest rainfall in Telangana** followed by Mulugu (1190.7mm) and Kumuram Bheem Asifabad (1136.4mm).

- The lowest rainfall in Telangana is received by **Jogulamba Gadwal (632.5mm)** followed by Nagarkurnool district (647.8mm)
- Among mandals, the Venkatapuram mandal in Mulugu district receives highest rainfall (1601.3 mm) followed by Wazeed mandal in Mulugu district (1483.9 mm) and Cherla mandal (1394.6 mm) in Bhadradi Kothagudem district.
- **Ghattu mandal in Jogulamba Gadwal (492.9 mm) receives the lowest rainfall followed by Vangoor mandal in Nagarkurnool district (520.2 mm) and Chinna Chintha Kunta (539.4 mm) in Mahabubnagar district.**
- **The extreme Northern and Eastern districts of the state (Adilabad, Kumuram Bheem Asifabad, Nirmal, Mancherial, Mulugu) records a higher number of annual rainy days as compared to extreme Southern districts (Mahabubnagar, Wanaparthy, Jogulamba Gadwal, Nagarkurnool).**

## WINTER SEASON

Winter season in Telangana extends from the months of **December to February**. The state experiences significantly high cold during the winter season.

- **The temperature is generally lower in Northern Telangana due to cold winds.**
- As per Weather and Climatology of Telangana 2022, the maximum temperature during winter season is recorded in the districts of Khammam (33.4°C) followed by Bhadradi Kothagudem (33.2°C) in the state.
- **The minimum temperatures in the seasons are recorded in the districts of Adilabad (15.0°C) and (15.3°C) in Kumuram Bheem Asifabad.**
- According to Weather and Climatology of Telangana 2022, **the minimum temperature in this season reaches its lowest to 5°C over Adilabad, Kumuram Bheem Asifabad, Peddapalli and Mancherial districts in December to second week of January.**



## CLIMATIC ZONES OF TELANGANA

According to Weather and Climatology of Telangana 2022, the state is divided into three climatic zones based on the geographical characteristics such as rainfall and temperature. These zones are as follows:

**Northern Telangana Zone** - The annual rainfall in this zone (June to May) ranges from 900 to 1150 mm and is received mostly during South-West monsoon season.

- Minimum and maximum temperatures during winter and summer seasons range between 15°C to 25°C and 32°C to 40°C, respectively.

**Central Telangana Zone** - This zone receives annual rainfall (June to May) from 800 to 1350 mm.

- Minimum and maximum temperatures during winter and summer ranges between 18°C-25°C and 32°C-38°C, respectively.

**Southern Telangana Zone** - The annual rainfall in this zone (June to May) ranges from 610 to 850 mm.

- Minimum and maximum temperatures during winter and summer ranges between 20°C -26° C and 32°C-38°C-26°C, respectively.

### High Altitude and Tribal Zone

The annual rainfall (June to May) in this zone is around 1100 to 1350 mm. Minimum and maximum temperatures during winter and summer ranges between 16.5°C-25°C and 32°C-39°C, respectively.

## II. ANDHRA PRADESH

### 1. MINERAL AND ENERGY RESOURCES OF ANDHRA PRADESH

Andhra Pradesh has a rich and wide variety of mineral resources, due to its varied geology.

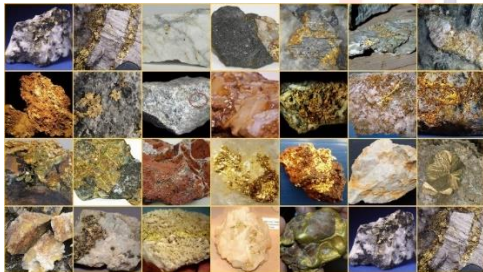
The State Government is trying to use its mineral wealth in a proper way and utilize it for future generations.

Andhra Pradesh is a storehouse for minerals specifically for gold, diamond, bauxite, beach sand, limestone, coal, oil and natural gas, manganese, dolomite, quartz, feldspar, precious and semi-precious stones, clays, calcite, steatite, iron ore, base metals, barytes, uranium, granite, limestone slabs, marbles, dimensional stones and other building materials.

### IMPORTANT MINERALS IN ANDHRA PRADESH

#### GOLD

- Generally, gold is found in quartz layers as placer mineral. **Andhra Pradesh is the state where the first mine of gold in India was dug.**
- The Ramagiri of Sri Sathya Sai district, Ananthapur and Chittoor districts has rich reserves of gold in the state.



#### CHROMITE

- It is prepared by combining chromium with iron and is the only alloy of chromium metal. **It is used to impart high hardness to steel.**
- In stainless steel, approx **18% of chromium is present.**
- The major chromite reserves in Andhra Pradesh are located in **Kondapally hills** between Ibrahimpatnam and Gangineni of NTR and Krishna districts respectively.



#### ULFRAMITE

- It is an alloy of tungsten metal and is used in production of tungsten filaments.
- **The reserves of ulframite in Andhra Pradesh are found in surroundings of Buruguwada of East Godavari district.**

#### IRON

- The iron ore reserves in Andhra Pradesh are present in Krishna, Kurnool, Nandyal, Sri Sathya Sai, Anantapur, YSR Kadapa, Nellore, Prakasam, Guntur and Chittoor districts.
- **Most of the iron found here is of Hematite type.**
- Anantapur stands **first in the production of iron in Andhra Pradesh.**

#### BAUXITE

- **It is the alloy of Aluminium metal.** The bauxite reserves in Andhra Pradesh are present in Khondalite rocks of Archean age in the Eastern ghats.
- **These deposits mainly lie in the Visakhapatnam and Rampachodavaram of Alluri Sitharama Raju districts.**
- These reserves are spread in the regions of Sunkaramitta, Anathagiri, Araku, Galikonda, Rakthakonda, Katuki, on the hills of Bittamugondi, Chintapalli, etc.

#### ILAMENITE-ROOTILE MONAZITE

- Ilamenite and rootile are the **two main minerals in Titanium.**
- **Monazite sands are composed of thorium oxide with radioactive properties.**
- Ilamenite monazite sands are present in the East coast of Srakulam, Anakapali, Visakhapatnam, Kakinada east Godavari, West Godavari, Konaseema, Krishna, Guntur, Prakasam and Nellore districts.
- **Monazite reserve is abundantly present at Bhemunipatnam of Visakhapatnam district.**

#### ZIRCON

- **Zircon mineral is used to produce zirconium which is a metal used for the production of mixture metals required in nuclear power plants, enamel industries, etc.**
- Zirconium reserves are found in **Vizianagaram and Srikakulam districts of Andhra Pradesh.**





## MANGANESE

- Manganese in Andhra Pradesh is related to a kind of hybrid rock called **Kondurite** which is named after a Koduru village near Chipurupally of Vizianagaram district.
- This rock contains **quartz, feldspar, manganese, garnet, manganese pyroxene, etc.**
- It is a major source of manganese mineral.

Srikakulam district of Andhra Pradesh is at the top in both the production and reserves of manganese. It is also found in Vizianagaram, Parvathipuram and Manyam districts.

## LEAD

- Kurnool district in Andhra Pradesh has the predominant presence of lead in the state.
- Other areas where lead reserves are present are Guntur, Palnadu, YSR Kadapa, Chittoor, Eluru and West Godavari, districts.
- Lead is also made in Hindustan Zinc Limited of Visakhapatnam.

## COPPER

- Agnigundala of Guntur district and Kambam rock arrangements of YSR Kadapa district are the major reserves of copper in Andhra Pradesh.
- In Kambam rock arrangements, copper reserves are Present in chalk quartz, limestone related to dolomite.
- Other major areas of copper reserves include Basthipadu of Ghanikaluva area, Kummarikonda, Jonnagiri area of Kurnool district, Jangamarajupalle, Velidendla, Vemula, Chinnakudala, Besthavalipalle, Brahmanapalle and areas of Venkatapuram in YSR Kadapa district.

## MICA

- Mica is an essential mineral for electrical industries, and it has the property of getting split up as thin layers.
- In Andhra Pradesh, mica reserves are confined to SPS Nellore district, but also spread over some regions in the districts of Krishna, Palnadu, Eluru, West Godavari, Srikakulam, Visakhapatnam, Guntur, Tirupati, Chittoor and Ananthapur.
- Guduru and Rapur are the major locations of mica reserves in Nellore district.
- The Guduru mica reserves of Nellore district belong to Muscovite type.

## QUARTZ

- Quartz reserves are present in the districts of Palnadu, Bapatla, Guntur, Nellore and Prakasam.
- It is mainly used in the glass industries. It is used as a solvent incosting and in making of ferro silicon, silica bricks and silicon carbide.



## VERMICULITE

- Kashipatnam area of the Visakhapatnam district has deposits of Vermiculite mineral.
- Vermiculite is used as resistor of heat, electricity and sound.
- It is also found in SPS Nellore and Anakapalli districts.

## EPATITE

- Small deposits of epatite is present in Andhra Pradesh at Kashipatnam area of Visakhapatnam district and Anakapalli district.
- It is mainly used as the raw material in fertiliser industry.

## GRAPHITE

- Graphite deposits are most abundant in the NTR, Krishna districts.
- Other places where reserves of graphite are found are districts of East Godavari, West Godavari, Anakapalli, Visakhapatnam and Srikakulam.
- It is used as the chief mineral in the industries of colours, moulds and pencils.



## OCARS

- This mineral is mainly used in the preparation of paintings.
- The reserves of ocars are found in districts of YSR Kadapa, Kurnool, Nandyal, Eluru, West Godavari and Visakhapatnam.

## CLAY

- There are various forms of clay such as Kaolin or China clay, fire resistant clay, ball clay, pullers earth bentonite.
- The deposits of clay in Andhra Pradesh are present in Eastern ghats and mainly in the districts of



Visakhapatnam, Anakapalli, Kakinada, Srikakulam, East Godavari, West Godavari, Ananthapur, YSR Kadapa and Nellore.

- **The clay found at Dwaraka Tirumala area of Eluru district is of best quality.**
- **Clay is mainly used in the manufacture of ceramic material.**
- It is also used as filler in paper, clothes, colours and rubber industries.



## KAINITE

- This mineral is available in the areas of Malekonda, Bandakindapalle, Chundi and Saidapuram of SPS Nellore district.
- **It is mainly used in heat resistant industries, glass and ceramic industries.**

## GYPSUM

- The reserves of gypsum in Andhra Pradesh is present at Pulicat lake near Sullurupeta of Nellore district.
- **It is mainly used in the cement and fertilisers industries.**
- It is also used as fillers in the manufacture of paper, paintings, rubber and manufacture of plaster of paris.



## CORUNDUM

- **Corundum is found in the districts of Ananthapur, Sri Sathya Sai and Chittoor.**
- Here, corundum is available in the most basic Kainite related rocks belonging to Archean age.
- **It is a mineral having high hardness.**

## TALC/SOAP STONE/STEATITE

- **Andhra Pradesh is one of the states in India where the best quality of talc is found.**

- The high-quality reserves of talc is present in the Muchukota reserve forest area, Tadipatri of Ananthapur district and Muddavaram village in Kurnool district.
- **The cheap quality reserves can be found in Kotha Gangireddy Palli of YSR Kadapa district and Chittoor district.**
- Talc is used in the manufacture of cosmetics, paintings, paper, rubber and lubricants, etc.

## ASBESTOS

- The reserves of asbestos are mainly found in the YSR Kadapa, Sri Sathya Sai, Annamayya, Kurnool and Ananthapur districts.
- **Only Cresolyte type of asbestos is available in Andhra Pradesh.**
- In the Pulivendula area of YSR Kadapa district, the best quality Cresolyte Asbestos reserves are available.
- Chinnakudala, Brahmanapalle, Lopatanuthala are other areas in YSR Kadapa and Annamayya districts where reserves of asbestos are found.
- **Asbestos is mainly used in the manufacture of brick linings, fire resistant cloths, electrical resistors, cement sheets, etc.**

## FELDSPAR

- In pegmatites formations in the Micamekala of Nellore district, deposits of feldspar are found.
- **Feldspar is mainly used in the ceramics and glass industries.**

## DIAMONDS

- **Vajrakarur of Ananthapur district is famous place for the reserves of diamonds.**
- Other places of diamond deposits are in Paritala, Ustaravalli, Nemalipuram, Banganapally, Munimudugu, Basavapuram of NTR, Krishna YSR Kadapa, East Godavari, Kurnool, Nandyal and Guntur districts.

**Paritala and nearby villages of NTR district formed the area of rich diamond mines called Kollur mines (Gani Kollur).**

- **The world-famous Kohinoor, Regent, Pitho, Nizam diamonds were found in the Krishna River valley.**

## BERYL

- Beryl deposits are mainly found at Ellen mines in Micamekala, Pallimetta, Gaddathippa areas of Nellore, and Srikakulam district.
- **Beryl is mainly used in the manufacture of Aeroplane, ships, tanks, guns and electrical elements, etc.**



## BARYTES

- In Andhra Pradesh, the barytes reserves are mainly found in the districts of YSR Kadapa, Annamayya, Sathyasaithy Sai, Ananthapur and Kurnool.
- **Small deposits are also present in the Krishna and Prakasam districts.**
- Barytes are mainly used as drilling mud in the drilling of petroleum.
- **It is also used in the colour industry, manufacturing rubber, paper, calico, anolium and barium.**

## LIMESTONE

- **The high quality limestone deposits are found in Jammalamadugu, Maidakuri areas of YSR Kadapa district.**
- Bethamcherla and Koilakuntla of Nandyal district have reserves of limestone.
- Limestone is the main raw material in the cement industry.
- **It is also used in the production of calcium carbide and bleaching powder.**

## SLATE

- **Slate deposits is mainly available in the Markapuram area of Prakasam district.**
- Other areas include Guntur and Palnadu districts.



## PYRITES

- **Pyrite is an ore of sulphur and is mainly used in the manufacture of sulphuric acid.**
- Pyrite reserves are present at the tip of Machilipatnam sea coast in Andhra Pradesh.

- Jammalamadugu in YSR Kadapa, Annamayya and Kurnool districts have reserves of pyrites with a chemical mixture of sulphur with iron.

## BUILDING STONE

- In Andhra Pradesh, kondalite, neftinite, limestone, quartzite and granites of various colours are used as building stones.
- **Building stones are found in YSR Kadapa and Prakasam districts.**
- YSR Kadapa district is famous for Shabadh or Kadapa flooring tiles and Prakasam is famous for Galaxy Granite tiles.
- Apart from these, Kuppam division of Chittoor district is famous for black granite which is polished and exported to foreign countries.
- **In SPS Nellore district, kainite type granite is found.**



**Manganese** in the state is related to a kind of **hybrid rock called Kondurite.**

**Kashipatnam** area of Visakhapatnam district has **deposits of Vermiculite mineral.**

**Vajrakarur** village of Ananthapur district is famous for **diamond reserves.**

**Petroleum was discovered in 1979** for the first time in the state, at Lingana Boinacherla village in Narsapur mandal of West Godavari district.

## PETROLEUM AND NATURAL GAS

- **Hydrocarbon reserves in Andhra Pradesh is present in Krishna-Godavari basin.**
- In this area, a survey was conducted in 1959 and in 1978, drilling operations were started.
- On 19th December 1979, petroleum was discovered for the first time in Andhra Pradesh at Lingana Boinacherla (Narsapur) West Godavari district.
- **In Andhra Pradesh, natural gas and crude oil are present at Kaikaluru, Rajolu, Chinchunada and Medara-Vanimeraka areas near the sea coast.**

## Andhra Pradesh Mineral Development Corporation

Andhra Pradesh Mineral Development Corporation has been established as a full-scale state government organization in 1961.

This organization discovered several mineral resources in Andhra Pradesh such as Barytes in Mangampeta YSR





(Kadapa), Asbestos from Brahmanapally (Nandyal) and Clay in Dwarka-Tirumala (Eluru), etc.

## MINERALS OF ANDHRA PRADESH

MINERAL	DISTRICT
Heavy mineral beach sands	Srikakulam, Vizianagaram, Anakapalli, Konaseema, Kakinada, Visakhapatnam, East and West Godavari, Krishna
Bauxite	Visakhapatnam, Anakapalli East Godavari
Limestone	Kurnool, YSR Kadapa, Nandyal Krishna, Ananthapur
Diamond	Ananthapur, Kurnool, Nandyal, NTR, Krishna
Manganese	Srikakulam, Parvathipuram Manyam Vizianagaram
Graphite	Srikakulam, Parvathipuram Manyam Vizianagaram, Eluru, Visakhapatnam, East Godavari
Gold	Chittoor, Kurnool, YSR Kadapa, Ananthapur, Sri Sathya Sai
Low grade iron ore	Prakasam, Palnadu, Nandyal, Guntur, Ananthapur, Kurnool
Coal	West Godavari, Eluru, Konaseema
Lead Zinc	Bapatla, Palnadu, Guntur, YSR Kadapa, Kurnool
Copper	Palnadu, Guntur, YSR Kadapa, Annamayya, Kurnool, Nandyal
Barytes	YSR Kadapa, Ananthapur, Annamayya, Nellore, Sri Sathya Sai
Calcite	Visakhapatnam, Anakapalli
Mica	Nellore, Tirupati, Konaseema, Eluru
Ochre	YSR Kadapa, Annamayya, Nandyal, Kurnool
Talc/Steatite/Soapstone	Chittoor, Ananthapur, Sri Sathya Sai, Annamayya, YSR Kadapa, Kurnool
Laterite	Kakinada, East Godavari, YSR Kadapa, Nellore, Kurnool, Nandyal
Black/Galaxy/Colour granite (in mn cum)	All districts except Nellore, Eluru, Konaseema and West Godavari

## MINERAL POLICIES IN ANDHRA PRADESH

### ORDINARY SAND POLICY, 2016

The Ordinary Sand Policy was notified by the State Government on 4th March 2016.

Some of the major provisions of this sand policy are listed as follow:

- Sand shall be made available to the public without charging any fee from 2nd March 2016.
- Stringent punitive measures were put in place to deal with violations of the policy.
- Sand quarrying is prohibited within 500 meters from bridges, culverts, ground water structures, tube wells, drinking water borewells, irrigation structures, state and national highways, railway lines, etc.
- No stocking of sand more than the requirement for own construction is permitted.
- Sand shall not be used for any purpose other than building construction and no sale of sand is permitted.
- Transportation of sand to any other state by any entity is strictly prohibited as a serious offence.
- De-casting sand of patta lands is also permitted only after verification of ownership, fixation of boundaries and assessment of sand quantity to be removed.

### SAND MINING POLICY, 2019

This policy was notified in 2019. It is aimed at promoting manufactured sand in place of river sand in construction activity.

- Manufactured sand, popularly known as M-Sand is fine aggregate sand produced by crushing hard rocks and stones into sand sized particles.
- Under this policy, the government decided to provide a subsidy on interest at the rate of 3% per annum (Pavalavaddi scheme) on facility up-gradation costs, for upgrading the existing stone crusher units to M-Sand units within a period of six months.

## ENERGY RESOURCES OF ANDHRA PRADESH

Energy resources are required for the growth and smooth functioning of the state economy.

- The main source of energy in the state are in the forms of thermal, hydroelectricity and renewable power.
- According to the Economic Survey 2022-23, the total installed capacity of energy in Andhra Pradesh is 18518.062 MW.
- Various Energy Efficiency and Energy Conservation (EE & EC) programs are under implementation in the state.

## THERMAL POWER PLANTS

Thermal power plants are based on the fuel coal, gas, diesel, etc.

The public sector undertaking NTPC, state level power generating companies, and private firms are engaged in this sector for power generation.

- **Andhra Pradesh is the home of several massive thermal power plant.**
- The state has recently sold a few of its thermal power plant to Telangana.
- The Thermal Power generation in Andhra Pradesh is divided into two types viz., coal-based power plants and gas-based power plants.



## COAL-BASED POWER PLANTS

Some of the coal-based power plants in Andhra Pradesh are:

### 1. Dr. Narla Tata Rao Thermal Power Station

- **It is located at Vijayawada in Andhra Pradesh.** It was constructed in 1974 at Ibrahimpatnam in NTR district.
- **It was developed under 4 stages.** It is named after Narla Tata Rao, the erstwhile chairman of the Andhra Pradesh State Electricity Board.
- **It is one of the coal-based power plants of Andhra Pradesh Power Generation Corporation (APGENCO).**

### 2. Rayalaseema Thermal Power Project

- **It is operated by AGENCO.** It comprises 5 units each 210 MW, built between 1994 and 2010.
- The source of raw materials is from Mahanadi coalfields.
- **Bharat Heavy Electricals Limited (BHEL) is commissioned for design, engineering, manufacturing and supply of the project.**

### 3. Simhadri Super Thermal Power Plant

- **It is a 2000 MW coal plant in Parawada village of Visakhapatnam.**
- The plant were commissioned on February 2002.
- **The source of coal for this plant is Talcher coalfield, Odisha.**
- NTPC Simhadri is a combination of four independent generation units.
- **Each of the four units has a capacity of 500 MW.**

### 4. Simhadri Super Thermal Power Plant

- **It is a coal-fired power plant located in the outskirts of Visakhapatnam city.**

- Units 1 and 2 of this plant were built in the first phase of development, and were commissioned in February 2002 and August 2004, respectively.
- **It is the first coastal coal fired thermal power station of NTPC Limited.**
- This Plant receives more than 85% of its water needs from the Sea.
- **The plant comes under Government of India and power generated is shared between multiple states.**

### 5. Sri Damodaran Sanjeevaiah Thermal Power Station

- **It was established at Nelaturu village, Krishnapatnam in Nellore district in 2014.**
- The capacity of plant is 2400 MW power generation.
- **It is named after the late Sri. Damodaram Sanjeevaiah, former Chief Minister of Andhra Pradesh.**
- The power plant is one of the coal-based power plants of Andhra Pradesh Power Development Company Limited (APPDCL).

### 6. Rayalaseema Thermal Power Project (RTPP)

- **It is located at Yerraguntla mandal in YSR Kadapa district.**
- It is one of the coal-based power plants of APGENCO.
- **Bharat Heavy Electricals Limited (BHEL) commissioned stage IV unit in March 2018 leading to total installed capacity of RTPP to 1650MW.**

### 7. Hinduja National Thermal Power Plant

- **It is a coal-based thermal power plant located in Palavalasa village in Visakhapatnam district.**
- The power plant is owned by Hinduja National Power Company Limited, a subsidiary of the Hinduja Group.
- **The power plant is located on the coast of the Bay of Bengal and it uses sea water for cooling purpose.**

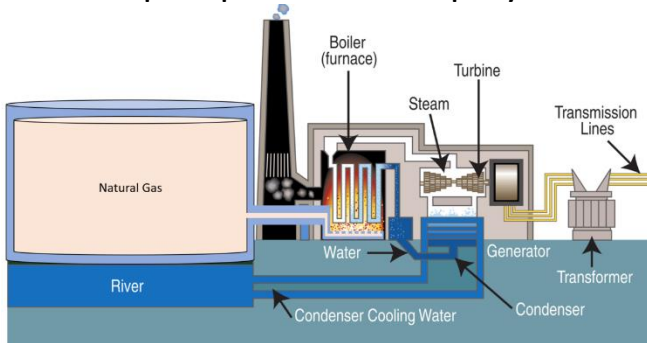
## GAS-BASED POWER PLANTS

Some of the gas-based power plants in Andhra Pradesh are:

### 1. APGPCL Combined Cycle Power Plant

- **It is the first gas-based power plant was set up in Andhra Pradesh and South India.**
- It was incorporated by Andhra Pradesh State Electricity Board (APSEB).
- It got commissioned in 1990 and located near Godavari River, Vijjeswaram, West Godavari district in the state of Andhra Pradesh.
- **This power plant runs on dual-fuel. The primary fuel being used to power the plant is natural gas.**
- In case of shortage of natural gas, the plant can also run on Naptha.

- The project is currently owned by Andhra Pradesh Gas Power with a stake of 100%.
- The power plant has installed capacity of 272 MW.



## 2. Gautami Combined Cycle Power Plant

- It is located at Peddapuram in Kakinada district in the state of Andhra Pradesh.
- It is one of the gas-based power plants of GVK Group.
- The project was originally developed by Satyam Construction Co (later acquired by Nagarjuna Construction) with Maytas Infra and IJM (India) Infrastructure Ltd.
- The power plant has installed capacity of 469 MW.

## 3. Jegurupadu Combined Cycle Power Plant

- It is located at Jegurupadu in East Godavari district in state of Andhra Pradesh. It was commissioned in 1997.
- It is India's first independent gas and naphtha based power plant.
- The power plant is one of the gas based power plants of GVK Group.
- The power plant has installed capacity of 445 MW.

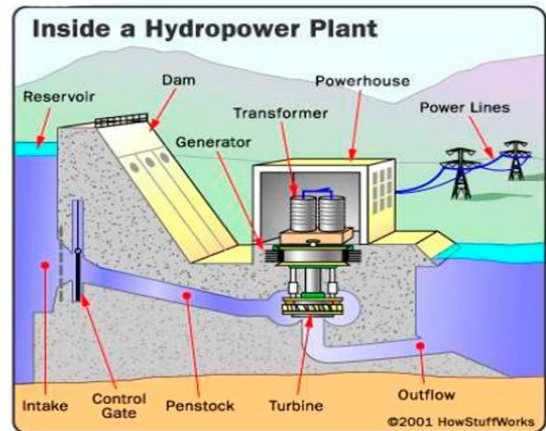
## SOME IMPORTANT POWER PLANTS IN ANDHRA PRADESH

THERMAL POWER PLANT ESTABLISHING YEAR	LOCATION	CAPACITY
Surya Chakra Thermal Energy Pvt Ltd. (1995)	Jupudi Village, Srikakulam	1200 MW
Kothagudem Thermal Power Station (1966)	Paloncha	1800 MW
Kineta Power Ltd. (2006)	Thamminapatnam, Nellore	1980 MW
Vemagiri Power Generation (2006)	Vemagiri, East Godavari	767.6 MW
Thermal Tech Power	Painamparan, Nellore	1980 MW

Corporation (2009)		
Meenakshi Thermal Power Station (2012)	Krishnapatnam, Nellore	300 MW
Vizag TPS (2015)	Gajawaka, Visakhapatnam	1040 MW

## HYDRO-ELECTRIC POWER PLANTS

For the generation of hydel power, conditions like overflowing water, its speed and volume and suitable location to construct projects, are required.



Some of the hydro-electric power plants are discussed below:

### 1. Machkhand Hydro-electric Project

- It is a joint project of Andhra Pradesh and Odisha.
- It is the first hydel power station that was built in Coastal Andhra.
- The production capacity of Machkhand Hydel project is 120 MW in which 84 MW is used by Andhra Pradesh.
- It supplies power to Visakhapatnam, Anakapalli, Srikakulam, Eluru, West Godavari, East Godavari and Guntur districts.

### 2. Nagarjunasagar Right Canal Powerhouse

- It is located in the Vijayapuri South of Guntur district in Andhra Pradesh and was constructed between 1955 and 1967.
- The source of water for generation of power is Krishna River.
- It is owned and controlled by APGCL.
- The capacity of the powerhouse is 90 MW.

### 3. Tungabhadra Hydro-electric Project

- It is a joint project of Andhra Pradesh and Karnataka.
- It was commissioned in 1957.
- The source of water for the generation of power is Tungabhadra and Krishna River basin.
- It is owned by the Central Government and the operating company is Tungabhadra Board.



- It has an approved and installed capacity of 72 MW.
- It supplies power to Kurnool, YSR Kadapa, Ananthapur and Chittoor districts.

#### 4. Upper Sileru Hydro Power Station

- It is located in Gudem Kotha Veedhi village in Alluri Sitharama Raju district.
- It was commissioned in the year 1967. Its total installed capacity is 240 MW.
- The source of water for this plant is from Sileru river.
- Visakhapatnam and Anakapalli districts are most benefitted by this power station.

#### 5. Penna Ahobilam Hydro Power Station

- It is located in Ananthapur district and was commissioned in 1997.
- Its source of water is from Ahobilam balancing reservoir dam.
- It has an installed capacity of 20 MW.

#### 6. Srisailem Right Canal Powerhouse

- It is constructed across the Krishna River at Sunni Penta in Kurnool district.
- It was commissioned in 1982 with installed capacity of 770 MW.
- It is the biggest Hydel power project of Andhra Pradesh.
- It is also called as Neelam Sanjiva Reddy Sagar Project.

### SOME OTHER HYDRO-ELECTRIC POWER PLANTS IN ANDHRA PRADESH

POWER STATION	LOCATION	CAPACITY	SOURCE
Hampi Dam Power House (1958)	—	36 MW	—
Lower Sileru Power House (1976)	Mothugudem in East Godavari	460 MW	Sileru
Donkarayi power House (1983)	Donkarayi Camp (East Godavari)	25 MW	Donkarai dam canal
Chettipeta Mini Hydel (1991)	West Godavari district	1 MW	Godavari

### RENEWABLE ENERGY IN ANDHRA PRADESH

According to the Economic Survey 2022-23, the state has 7714.336 MW of renewable power installed capacity.

- Of this, solar power projects contribute about 3755.62 MW and wind power projects contribute about 3693.55 MW of energy
- World's largest integrated renewable Energy Storage project (IRESP) is located built in Andhra Pradesh.
- It is Located at Gummitham Tanda in Kurnool district and is undertaken by Greenko Group.
- The project aims at generating 5230 MWs of electricity.
- The non-conventional energy Development Corporation of Andhra Pradesh Limited (NEDCAP) took place in the year 1986.

The Renewable energy resources are divided into solar energy and wind energy. These are discussed below:

#### SOLAR ENERGY

According to Economic Survey 2022-23, Andhra Pradesh has about 38 GW of solar potential.

- Andhra Pradesh has two largest solar power plant in India which have cumulative capacity of 4530 MW.
- Andhra Pradesh has 5 massive utility scale solar plants with a total capacity of 4160 MW.
- In 2022, Andhra Pradesh Government commissioned 3 MW floating solar project on Meghadri Gedda reservoir in Visakhapatnam.

Some of the solar power projects are discussed below:

#### 1. Kurnool Ultra Mega Solar Park

- It is a solar park spread over a total area of 24 sq km in Panyam mandal of Kurnool district, with a capacity of 1000 MW.
- It was inaugurated by then Chief Minister of Andhra Pradesh Nara Chandrababu Naidu in 2019.
- It was owned by Andhra Pradesh Solar Power Corporation Private Limited (APSPCL).



#### NP Kunta Ultra Mega Solar Park

It is also known as Ananthapuram Ultra Mega Solar Park or Kadiri Ultra Mega Solar Park.

It spreads over a total area of 32 sq km in Kadiri Division of Sri Sathya Sai district.

The first phase of the park was commissioned on 9th May, 2016 with a capacity of 1400 MW.



## 2. Kadapa Ultra Mega Solar Park

- It is a solar park spread over a total area of 24 sq km in the Mylayaram mandal of YSR Kadapa district.
- **The project is being implemented by the Andra Pradesh Solar Power Corporation Private Limited (APSPCL).**
- It is a joint venture of Solar Energy Corporation of India (SECI), Andhra Pradesh Power Generation Corporation and the New & Renewable Energy Development Corporation of Andhra Pradesh Ltd. (NREDCAP).

## 3. Mudasarlova Reservoir Solar Park

- It is a reservoir in Visakhapatnam which spreads over a total area of 0.25 sq km and has a power flow of 1.5MGD (millions of gallons per day).
- **The Government of Andhra Pradesh built this floating solar power plant with a 2MW capacity on the reservoir.**

### ANDHRA PRADESH SOLAR POWER POLICY, 2018

This policy aims to promote widespread usage of solar power and to meet the following objectives:

- **To target a minimum total solar power capacity addition of 5000 MW in the next five years in the state.**
- To develop a solar park with necessary utility infrastructure.
- **To deploy solar power agricultural pump set to meet farmer's electricity needs during daytime.**
- To promote local manufacturing facilities that will generate employment in the state.
- **To promote distributed generation that can help in avoiding upstream network cost and contribute towards loss reduction.**

### WIND ENERGY

According to Economic Survey 2022-23, Andhra Pradesh has about 44 GW of wind potential.

Some of the wind power projects in the state are discussed below:



## 1. APGENCO Wind Farm

- **It is commonly known as Ramagiri Windmill.**
- It was commissioned in **November, 1994.**
- It is located at Ramagiri in Ananthapur district and is operated by APGENCO.
- **It has installed capacity of 2 MW.**

## 2. NEDCAP Wind Farm

- It was commissioned on 31st March, 2001.
- **It is located at Kondamedapally, Ananthapur district and is operated by NREDCAP.**
- **It has installed capacity of 2.75 MW.**

## 3. Tirumala Tirupati Devasthanam

- **It was commissioned on 19th February, 2004.**
- It is located at Kakulakonda, Tirumala Hills in the Tirupati district and is operated by NREDCAP.
- **It has installed capacity of 6 MW.**

## 4. Vibrant Green Tech India Put Ltd

- It was commissioned on 15th December 2015.
- **It is located at Singanamala, Ananthapur district and is operated by NREDCAP.**
- It has installed capacity of 8 MW.

### ANDHRA PRADESH WIND POWER POLICY, 2018

This policy aims to promote widespread usage of wind power and to meet the following objectives

- **To promote wind power generation to meet the energy needs in environmentally and economically sustainable manner.**
- To attract private investment for establishment of large wind power projects.
- **To encourage investment of manufacturing facilities for generation of employment.**

### WIND-SOLAR HYBRID POWER POLICY, 2018

Some of the objectives of this policy are:

- **To promotion large grid connected wind-solar PV Systems for optimal and efficient utilization of transmission infrastructure and land.**
- To reduce the variability in renewable power generation and thus achieving better grid stability.
- **To procure the contracted capacity of 5000 MW at desired CUF.**
- To encourage new technology involving hybrid RE plants and other emerging technology like energy storage systems.

### RENEWABLE ENERGY EXPORT POLICY, 2020

Some of the objectives of this policy are:

- **To accommodate 120 GW renewable energy projects.**
- To facilitate the lease of 5 lakh acres of potential land in the state Andhra Pradesh to renewable energy export project developers.
- **To promote RE project by investor for exporting energy outside the state, without obligation to procure by the state discoms.**
- To promote setting up renewable energy equipment manufacturing facilities in the state.

### STATE FACTS FOLDER

Machkhand was the first hydel power station that was built in Coastal Andhra,



Srisailem Right Canal Powerhouse is the biggest hydel power project of Andhra Pradesh.  
Kurnool Ultra Mega Solar Park is situated in the Panyam mandal of Kurnool district.  
NEDCAP Wind Farm is located at Kondamedapally of Ananthapur district.

## ENERGY DEPARTMENTS

The power sector of Andhra Pradesh is divided into four categories namely Regulation, Generation, Transmission and Distribution. The departments for the development of energy in the state are:

### 1. Andhra Pradesh Electricity Regulatory Commission (APERC)

- It is an autonomous, statutory, and regulatory body constituted for ensuring generation and distribution of electricity within the state.
- It was formed in accordance with the Electricity Regulatory Commission Act, 1998.

### 2. Andhra Pradesh Power Generation Company (APGENCO)

- It deals with electricity generation and also maintenance, proposes new projects and upgrades existing ones as well.
- It also set up a Special Purpose Vehicle (SPV), named as Andhra Pradesh Power Development Company Limited (APPDCL), a joint venture company of APGENCO and IL&FS to set up Krishnapatanam thermal power project.

### 3. Andhra Pradesh Transmission Corporation (APTRANSCO)

- It is set up for transmission of power.

### 4. Andhra Pradesh Power Distribution Company (APPDCL)

- It is the power distribution company in the state, which is divided into three divisions, namely Eastern Power Distribution Corporation Limited (APEPDCL), Central Power Distribution Corporation Limited (APCPDCL) and Southern Power Distribution Corporation Limited (APSPDCL).
- It distributes power to the households, agriculture, and the industries.

### 5. New and Renewable Energy Development Corporation of Andhra Pradesh (NREDCAP)

- It is a state-owned company, actively involved in promoting renewable energy projects in the state.
- It was formed in the year 1986.

The objectives of NREDCAP are:

- Generate electricity through renewable sources like wind and solar.
- Conserve energy in rural area.
- Import and adopt viable technology and machinery in the areas of non-conventional energy sources and ensure post installation service.
- Impart training and to promote research and development in the field of non-conventional energy sources.

### 6. Andhra Pradesh Power Generation Corporation Limited (APPGCL)

- It was established on 28th December 1998, under the recommendations of Hittenbhayya committee setup by TDP Government and started operations from 1st February 1999.
- It was divided into Andhra Pradesh Power Generation Corporation (APGENCO) and Andhra Pradesh Transmission Corporation (APTRANSCO) on 1st February 1999 by AP Electricity Reforms Act.
- APTRANSCO was further divided on 1st April, 2000 into 'Transmission Corporation' and four 'Distribution Companies' (DISCOMS).





## PRACTICE QUESTIONS: GEOGRAPHY 2024

1. Consider the following statements about Temperature Inversion

1. It is the increase in temperature with increasing height temporarily or locally.
2. Short winter nights, cloudy sky, cold air and the presence of winds lead to temperature inversion.
3. During a temperature inversion, the temperature may fall below freezing point in the valleys leading even to the occurrence of frost.
4. Over polar region, temperature inversion is normal throughout the year

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

2. Consider the following statements about Coriolis force

1. It is responsible for the formation of meandering in the river.
2. It helps sustain the cyclonic circulation in the Doldrum region
3. It is maximum at the pole as compared to the equator and inversely proportional to the velocity of the wind.
4. It effects the rotation of celestial bodies such as planets and stars

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

3. Consider the following statements about Volcanoes

1. Volcanoes are responsible for creating more than 80 percent of the Earth's surface.
2. A volcano that has remained dormant for decades cannot become active again.
3. Over the years, volcanic materials have formed the most fertile Earth soil.
4. Fissure type volcanoes are resulted in the formation of plateaus

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

4. Consider the following statements about Ocean Waters

1. The continuous flow of large volumes of water in a definite direction is referred to as Waves.

2. Ocean water level is higher near the equator than at the middle latitudes.
3. Cold currents are found on the west coast of the continents, both in low and higher latitudes
4. Fishing is an important economic activity in regions where warm and cold currents meet.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

5. Consider the following statements

1. The climate is characterized by warm, moist summer and cool, dry winter.
2. Well-distributed rainfall throughout the year but maximum in June, July and August
3. Wet paddy or swamp rice is cultivated majorly in this type of climate

The above features are distinct characteristics of which among the following climate?

- (a) The tropical Monsoon climate
- (b) The warm temperate eastern margin
- (c) The cool temperate western margin
- (d) The temperate continental climate

6. Consider the following statements about Ocean gyres

1. They are large circulations in the ocean caused due to planetary winds and the Coriolis effect
2. The Sargasso Sea is associated with the north Atlantic gyre and is known for its biodiversity.
3. The Great Pacific garbage patch is the largest collection of marine pollutant materials associated with North Pacific gyre circulation

Which of the statements given above are correct?

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

7. Consider the following

Lake	Associated Physical Feature
Kettle lake	Karst region
Oxbow lake	River meanders
Lagoon Lake	Coastal region
Playa Lake	Wind erosion

How many pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

8. Consider the following statements about Jet Streams



1. They are high-velocity stratospheric winds present in both hemispheres
2. They shift Southwards during summer and blow in Southern Asia
3. The westerly Jet streams are more extensive and stronger during the summer season
4. Tropical Easterly Jet Stream are established during the summer season and plays an important role in the onset of the Indian monsoon

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

9. Among the following climatic conditions, identify the one which is not related to El-Nino circulation in the Pacific Ocean.

- (a) More frequent hurricanes in the North Atlantic Ocean
- (b) Higher sea surface temperature in the tropical eastern Pacific Ocean
- (c) Dry conditions in Southeast Asian countries
- (d) Floods in Peru and Ecuador

10. Consider the following statements about Soils

1. Generally, plants grow well in mild alkaline soil
2. Adding sulphur to the soil reduces the alkalinity of the soil.
3. Black soils are well aerated but poor in the water holding capacity.
4. Maximum humus content is found in the subsoil region due to dead and decaying organisms.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

11. Which of the following statement best explains the significance of the Clarion-Clipperton Zone?

- (a) A submarine region in the Pacific Ocean is estimated to contain abundant metallic nodules
- (b) A convergent plate boundary near Tonga island in the Pacific Ocean
- (c) A dead zone resulted from oxygen depletion in oceanic water in the Gulf of Mexico
- (d) A disputed exclusive economic zone between Brazil and Argentina.

12. Consider the following mechanisms responsible for climate change

1. Sunspots causing the difference in solar radiation

2. Variations in distance and tilt of Earth with respect to the Sun
3. Major volcanic eruption
4. Changes in magnetic field strength of Earth

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

13. Consider the following statements about South Atlantic Anomaly (SAA)

1. It is the behaviour of Earth's Geo-Magnetic field in an area between Africa and South America.
2. The area where the Earth's inner Van Allen radiation belt comes closest to the Earth's surface
3. The SAA is the near-Earth region where the Earth's magnetic field is strongest
4. This leads to an increased flux of energetic particles in this region

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

14. Which of the following is not primarily the result of gravitation force of Earth?

- (a) River flow
- (b) Land Slides
- (c) Tides
- (d) Lahar flow

15. Consider the following statements about Hotspot Volcanoes

1. It refers to the active volcanoes found along the Pacific ring of fire.
2. They are usually associated with convergent plate boundaries.
3. Emperor seamount in the Pacific Ocean is known to be formed due to hotspot volcanic activity.

Which of the statements given above are incorrect?

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

16. Consider the following statements about Atmospheric Phenomenon

1. The temperature and humidity in an air mass are uniform and hardly any fall in temperature is noticed with increasing altitude.
2. When contrasting air mass meets, it can result in the formation of Tornadoes.



3. The wind velocity in a tropical cyclone is higher than that of a temperate cyclone
4. Occluded front are formed when air mass is fully lifted above the land surface

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

17. Consider the following statements about the origin and evolution of the Universe

1. The first galaxy was born immediately after the Big Bang
2. The Universe mostly remains the same at any given point in time
3. The space between the galaxies has been increasing since their origin
4. James Webb Space Telescope was launched to know the origin and evolution of universe

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

18. Consider the following statements about Earth Quakes

1. Both P and S waves travel through the body of the Earth
2. Surface waves or L waves are high frequency waves that travel through the crust
3. The magnitude of an Earthquake indicates the quantity of energy released by an earthquake at the source point, which is measured using the Mercalli Scale.
4. The US Geological Survey is a responsible institution for measuring and assessing Earthquakes across the world

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

19. Consider the following statements

1. The volume of renewable water on Earth remains constant
2. Water available in Ice caps and Glaciers is nearly thrice the volume of Groundwater.

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

20. Consider the following statements

1. Jet streams are special types of geostrophic winds that are predominantly westerly winds.
2. Geostrophic winds are caused by Coriolis force, frictional force and pressure gradient forces
3. The speed of the wind is depend on pressure gradient force and frictional force

Which of the statements given above are correct?

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

21. Consider the following statements

1. Indian Ocean dipole (IOD) is defined as differences in Sea Surface Temperature (SST) in the equatorial Indian Ocean similar to ENSO.
2. The Indian summer monsoon is affected by the Atlantic SST variability.
3. Positive IOD and negative Equatorial Indian Ocean Oscillation (EQUINOO) events bring more rainfall to India
4. Negative IOD gives more rainfall to Australia

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

22. Consider the following pairs about different tectonic plates and their location

Tectonic Plate	Location
Caroline plate	Between Philippine and Indian plate
Nazca plate	Between Central America and the Pacific plate
Scotia plate	Between South Africa and the Antarctic plate
Cocos plate	Between South America and the Pacific plate

How many pairs given above are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

23. This type of climate is found in the temperate regions of the world, and it is characterized by warm moist summers and cool, dry winters. The mean monthly temperature is between 40degrees F and 78 degrees F and has a strong maritime influence. The region has well distributed rainfall with thunderstorms in summer with the occasional occurrence of Tornadoes. The region exhibits monsoonal characteristics with more than 200 frost-free days, and the





abundant moisture favours the cultivation of cotton and maize. On the highlands, conifers such as pines and cypresses are important softwoods. It is also called a slight monsoonal type of climate.

Which one of the following types of climate best describes the above passage?

- (a) Laurentian type climate
- (b) British type climate
- (c) Gulf type climate
- (d) Steppe type climate

24. Consider the following statements about corals

- 1. Corals survive only in warmer tropical and subtropical latitudes
- 2. Polyps along fringing reefs will die immediately once the water recedes during earthquakes.
- 3. The corals are best developed on the inner aspect of Atolls due to less disruption by ocean currents.
- 4. Corals are generally absent on western margins of continents due to presence of hot surface water

How many statements given above are incorrect?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

25. Consider the following statements

- 1. Aphelion is the position at which the Earth is at its farthest from the Sun
- 2. The Earth is at Aphelion in the early month of July, which is 152 million km away from the Sun.
- 3. Being farthest from the Sun, the Earth experiences a significant drop in temperature
- 4. The varying distance between the Sun and the Earth does not cause seasons

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

26. Consider the following statements

- 1. Ocean surface Salinity affects the water cycle and ocean circulation.
- 2. The annual range of temperature of ocean surface water decreases with latitude from the equator towards the poles
- 3. Salinity over tropics is relatively low
- 4. Abyssal zone has zero oxygen

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

27. Consider the following statements about Mid-Oceanic Ridges

- 1. Mid-oceanic ridges are continuous mountain ranges that occur along convergent plate boundaries.
- 2. Mid-oceanic ridges are much younger than continental areas.
- 3. Mid-Atlantic ridges do not create Rift Valley in the Atlantic Ocean because it spreads quickly
- 4. Mid-oceanic ridges resulted in creation of new land masses

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

28. Consider the following statements

- 1. The halocline is an ocean layer where salinity changes most rapidly with depth.
- 2. Pycnocline refers to the rapid change in density with depth.
- 3. The Arabian Sea experiences less salinity than the Bay of Bengal due to the influence of the southwest monsoon
- 4. No living creatures can be found in anoxic zone

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

29. Consider the following statements about Atlantic Meridional Overturning Circulation (AMOC)

- 1. Atlantic meridional overturning circulation distributes heat and energy from the equatorial to the polar region
- 2. AMOC is driven by thermohaline differences.
- 3. North Atlantic drift alone decreases the severity of winter in Western Europe.
- 4. Climate change weakens the AMOC

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

30. Consider the following statements

- 1. Uranus and Neptune are called the Twin Planets of our Solar system.
- 2. Jupiter's moon Ganymede is the largest moon in our solar system, bigger than the Pluto
- 3. Venus is the hottest planet in our solar system



4. Saturn has highest number of moons in our solar system

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

31. Falkland Island recently seen in news is a disputed area between

- (a) Brazil and Argentina
- (b) UK and Argentina
- (c) Brazil and UK
- (d) Brazil and Paraguay

32. Identify the features that result to solar and lunar eclipses

- 1. Revolution of the moon around the Earth close to the Earth's ecliptic plane
- 2. The proximity between the moon and the Earth
- 3. The relative apparent size of the Sun and the moon

Which of the statements given above are correct?

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

33. Consider the following statements

- 1. Mesopause is the coldest place in Earth's atmosphere
- 2. Halogens are less reactive in the ozonosphere.
- 3. The Karman line is located beyond the Thermosphere, the place where space begins
- 4. In the mesosphere, temperature increases with an increase in altitude.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

34. Consider the following statements

Statement 1: Cyclone are absent near the equator despite high temperature and moisture

Statement 2: Coriolis force near the equator is zero

Which one of the following is correct in respect of the above statements?

- (a) Both statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect

(d) Statement-I is incorrect but Statement-II is correct

35. Why are the Major hot deserts in the northern Hemisphere located between 20-30 degrees north and on the western side of the continents?

- 1. The incidence of warm currents along the western coastal regions causes the onshore winds dry.
- 2. The relative humidity is extremely high, making condensation almost impossible.

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

36. Consider the following statements about Frontogenesis and Temperate cyclones

- 1. Mid-latitude cyclones or temperate cyclones occur due to cold fronts.
- 2. Direction of mid-latitude cyclones is influenced by Jet streams
- 3. Occluded clouds are associated with extra-tropical cyclones
- 4. Cumulus clouds develop along cold fronts

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

37. Consider the following statements about equatorial type of climate

- 1. The annual range of temperature is high due to the direct incidence of sun rays in the equatorial region
- 2. Unlike temperate forests, tropical hardwoods are very strong which are widely used in boat-making industries
- 3. The equatorial region experiences peak rainfall during the months of April and October
- 4. The equatorial type of grassland found in Amazon lowlands is referred to as "selvas."

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

38. Due to climate change dam-like structure is a proposed solution to the problem of rising water levels in the North Sea. Consider the following statements about the North Sea

- 1. Because of the low rate of evaporation and the addition of fresh water, the North Sea has low salinity



- The North Sea is linked with the Baltic Sea by the strait of the Skagerrak.
- It is surrounded by Germany, Denmark, Belgium, Luxenberg, Netherland, and Norway

Which of the statements given above are incorrect?

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

39. Consider the following statements about Heat Domes

- A heat dome is an area of high pressure that traps heat over a region.
- Heat dome is mostly formed during La Nina when waters are warm in the Eastern Pacific and cold in the western Pacific
- Heat domes are stationary, and they last for a few days to a week or two

How many statements given above are correct?

- Only one
- Only two
- Only three
- None

40. Consider the following lakes

- Lake Michigan
- Sea of Galilee
- Lake Titicaca
- Lake Nyasa
- Lake Chad
- Lake Balkhash

How many of above lakes share an international border?

- Only two
- Only three
- Only four
- Only five

41. Consider the following countries about Danube River

- Slovenia
- Croatia
- Serbia
- Moldova
- Bosnia and Herzegovina

How many of the above countries did Danube River is flowing?

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

42. What is/are the possible impact of the convergence of the Labrador current and gulf stream?

- Chance of higher fish catch in this zone

- Chances of the accident of the boats due to a reduction in the visibility

Which of the statements given above are correct?

- Only 1
- Only 2
- Both 1 and 2
- Neither 1 nor 2

43. Consider the following statements about Blizzards

- A blizzard is a severe storm condition with low temperature, strong winds and snow.
- Blizzards can occur in tropical region.
- Blizzard can cause hyperthermia by exposure to frigid temperatures.
- Blizzards are common occurrence throughout India

How many statements given above are correct?

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

44. Consider the following statements about Interior of the Earth

- Volcanic eruptions
- Meteors
- Mining and deep drilling projects
- Seismic activities
- Earth's magnetic field

How many of the above are the direct sources to know the interior of the Earth?

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

45. Which of the following best describes the term 'Blue Blob'?

- It is the new technology for harnessing electricity from ocean water.
- It is an area with the highest species density declared by the IUCN in ocean water
- It is a cold patch formed in the Polar region
- It is one of the conservation efforts by UNEP to save the ocean water ecosystem

46. Consider the following statements about Interior of the Earth

- The continental crust is mainly granitic in nature and is denser than the Oceanic crust
- The asthenosphere is the lowermost portion of the mantle and is the main source of magma
- The outer core is in a liquid state, while the inner core is in a solid state





4. Inner core has highest density because it is made up of Nickel and Iron

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

47. Consider the following statements about Ozone layer

- 1. Generally, concentration levels of 220 Dobson Units or less are considered ozone depletion in the Stratosphere
- 2. Total ozone is generally highest at the equator and lowest in polar regions
- 3. The Montreal Protocol is a global agreement to protect the stratospheric ozone layer by phasing out ozone-depleting substances.
- 4. Solubility Ozone is higher than Oxygen

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

48. Consider the following statements

- 1. Weathering is a precondition for mass movements like landslides
- 2. Geomorphic agents do not cause mass movements.
- 3. Mass movements like mudflow and rockfall down the slope are due to the influence of gravity.
- 4. Large scale infrastructure projects can trigger mass movement

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

49. Consider the following geographical phenomenon

- 1. Denudation
- 2. Volcanic activity
- 3. Folding of crust
- 4. Deposition
- 5. Faults formation

How many of above are Endogenic processes?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) Only five

50. Consider the following statements

- 1. Aravalli is one of the oldest fold mountains in the world.

- 2. Unlike the Himalayas, the Rocky Mountains are formed by ocean-continent convergence.

- 3. Mt. Blanc is the highest peak in the Andes

- 4. Aravalli's are part of Deccan plateau

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

51. Consider the following statements about the factors controlling the nature and magnitude of tides

- 1. The shape of shoreline
- 2. Local winds and weather patterns
- 3. Changes in the position of the Sun and moon in relation to the Earth.
- 4. Uneven distribution of water over the globe

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

52. Arrange the following cities in descending order based on the length of the days during Summer in the Northern Hemisphere

- 1. Canberra
- 2. Oslo
- 3. San Francisco
- 4. Chennai
- 5. Kalimantan

Select the correct answer from the codes given below

- (a) 1-2-3-4-5
- (b) 2-1-5-4-1
- (c) 1-5-4-3-2
- (d) 2-3-4-5-1

53. Consider the following statements about Hot Springs

- 1. These springs are found in areas of present or past volcanic activity.
- 2. Hot springs which emit fountains of hot water and steam at almost regular intervals are called geysers.

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

54. Consider the following statements

Statement I: The dynamics of the Intertropical Convergence Zone have a significant role in changing the characteristics of the Indian monsoon rainfall

Statement II: The significant shifting of ITCZ towards the northern Hemisphere in summer causes South eastern trade



winds to encroach into the Northern Hemisphere and blow as Southwest monsoon winds.

Which one of the following is correct in respect of the above statements?

- (a) Both statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

55. Consider the following statements

- 1. La Nina conditions in the Pacific Ocean can cause dry conditions in the horn of Africa.
- 2. "gu" and "deyr" refers to the two rainy seasons in the horn of Africa.
- 3. Both Eritrea and Somalia border the Gulf of Aden.

Which of the statements given above are correct?

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

56. Consider the following statements

Statement I: The deep-sea plains of the Indian Ocean is highly rugged.

Statement II: This is due to its formation from a large amount of solidified lava extending for hundreds of kilometres

Which one of the following is correct in respect of the above statements?

- (a) Both statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I
- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

57. Consider the following statements about Cyclones

- 1. The cyclone's approach is characterized by a rise in barometric reading, clear sky, strong oppressive winds and bad weather
- 2. The approach of Anticyclone is characterized by the dull sky, calm air and low temperature in summer.
- 3. Wind speed during the depression is between the 49-61 km/h
- 4. Cyclones formed in Pacific ocean are known as Willy Willy

How many statements given above are incorrect?

- (a) Only one
- (b) Only two

- (c) Only three
- (d) All four

58. Consider the following statements

- 1. Vertical Temperature gradient refers to the fall in temperature with respect to altitude.
- 2. The Gradient value decreases by 6.5°C per kilometre of ascend
- 3. Nature of Soil can have an impact on temperature gradient

Which of the statements given above are correct?

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

59. Consider the following statements about fluvial erosional and depositional landforms

- 1. Swamps and Marshes
- 2. V-shaped valleys
- 3. Waterfalls and Rapids
- 4. Braided Channels

How many of the above are not formed during the old age course of a river?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

60. Consider the following statements with reference to the Deccan Trap

- 1. It is the result of Volcanic eruption
- 2. It is largely made of granitic rocks believed to be contributed by the Reunion Hotspot volcano
- 3. The lava plateau has a minimum thickness along the coast of Mumbai, from where it increases towards the south and east of the Deccan trap

How many statements given above are correct?

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

61. Consider the following statements about Western Disturbances in India

- 1. The inflow of western disturbances moves under the influence of westerly jet streams from the Mediterranean Sea
- 2. It influences winter weather conditions over most parts of the Northern Plains.
- 3. It brings abundant rain in the summer months.
- 4. They are beneficial for the Wheat cultivation in Punjab and Haryana

How many statements given above are correct?



- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

62. Consider the following pairs about major peaks and their locations

Peak	Location
Dhupgarh	Satpura
Nokrek	Mikir
Mulangiri	Baba-Budan
Amarkantak	Harischandra Ranga

How many pairs given above are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

63. Consider the following statements about Tidal Vegetation in India

1. It is found in abundance in the lower Ganga delta of West Bengal
2. They are practically evergreen with thin leaves
3. Palm, keora, and agar are some important species of tidal forest
4. They will act as a natural buffer against storm surges

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

64. Consider the following statements about hot weather conditions in India

1. The weather conditions are generally hot and dry throughout the country.
2. The hot weather season lasts till the end of June throughout the country
3. Loo, a hot, dry wind blows during December and January, mainly over the northern plains
4. Pre-monsoon showers in West Bengal are known as "Mango Showers"

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

65. Which of the following rivers having their origin in Kanchenjunga?

1. Kosi
2. Gandak
3. Tista

4. Dhubri
5. Rapti

Select the correct answer from the codes given below?

- (a) 1 and 3 only
- (b) 3, 4 and 5 only
- (c) 2, 4 and 5 only
- (d) 1, 2 and 3 only

66. Arrange the following hills from North to South

- (a) Bharner, Satmala, Mahadeo and Gawilghur
- (b) Mahadeo, Gawilghur, Bharner and Satmala
- (c) Bharner, Mahadeo, Gawilghur and Satmala
- (d) Satmala, Gawilghur, Bharner and Mahadeo

67. In comparison to the Himalayan rivers, consider the following statements with respect to Peninsular rivers.

1. These rivers are much younger than the Himalayan rivers
2. These rivers make both deltas and estuaries
3. These are mostly perennial
4. These rivers usually have large basins

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

68. Consider the following statements about tropical cyclones

1. A tropical cyclone is a rapid storm that originates only in warm ocean waters and has low pressure in the centre
2. 'Eye' is the central part of the tropical cyclone where violent storms and thunderstorm clouds are present
3. Strong vertical shear increases the intensity of the tropical cyclone.
4. El Nino events inhibit tropical cyclones in the Atlantic Ocean

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

69. Consider the following statements with reference to the Cold Desert of India (Ladakh)

1. The Karakoram range in the north and the Zaskar mountains in the south enclose it.
2. The rivers do not form deep valleys and gorges in these regions.
3. The air at this altitude is so thin that the heat of the Sun can be felt intensely





4. Drass, world's 2<sup>nd</sup> coldest habitable place is located in it

How many statements given above are correct?

- (a) Only one  
(b) Only two  
(c) Only three  
(d) All four

70. A state in India has the following characteristics

- It is bounded by independent countries on three sides
- In this state, Sun appears first in India
- The Mountainous terrain is divided into valleys by rivers flowing north to south

Which one of the following states has all of the above characteristics?

- (a) Assam  
(b) Sikkim  
(c) Tripura  
(d) Arunachal Pradesh

71. Consider the following statements about 'Black Soils'

- The colouration of the Black soil is due to the presence of Silica and Aluminium compounds
- The parent material of the soils are Deccan lavas, gneisses and granites
- In the upland regions, the soil may be less fertile compared to the soils found in the valleys and lowlands
- Cereals, oilseed vegetables and citrus fruits are grown over the soils

How many statements given above are correct?

- (a) Only one  
(b) Only two  
(c) Only three  
(d) All four

72. Consider the following statements about rivers and their tributaries

River	Tributary
Godavari	Pranhita
Narmada	Kundi
Mahanadi	Moyar
Tapi	Orsang

How many pairs given above are correct?

- (a) Only one  
(b) Only two  
(c) Only three  
(d) All four

73. Arrange the following west-flowing rivers of India from south to north direction

- Pampa
- Saraswati

- Zuari
- Sabarmati

Select the correct code given below?

- (a) 1-2-3-4  
(b) 1-2-4-3  
(c) 2-1-3-4  
(d) 2-3-4-1

74. Arrange the following ores in the increasing order of their iron content

- Limonite
- Siderite
- Haematite
- Magnetite

Select the correct answer using the codes given below

- (a) 1-2-3-4  
(b) 1-3-4-2  
(c) 3-4-1-2  
(d) 3-4-2-1

75. Consider the following statements about Himalayas

- It is a complex mountain system formed mostly of sedimentary and metamorphic rocks.
- The Shiwaliks are separated from the Northern Plains of India by the Main Boundary Thrust.
- Duns and Duars are the longitudinal valleys or alluvial plains found in the Himalayan region.
- Himalayan Frontal Fault separate Shiwaliks from Lesser Himalayas

How many statements given above are correct?

- (a) Only one  
(b) Only two  
(c) Only three  
(d) All four

76. Consider the following statements about National Water ways and the river they are associated with

National Water Way	River
National Water Way 2	Ganga-Bhagirathi-Hoogly river system
National Water Way 4	Godhawari river system
National Water Way 68	Cumberjua river system
National Water 73	Narmada river system

How many pairs given above are correct?

- (a) Only one  
(b) Only two  
(c) Only three  
(d) All four

77. Consider the following statements about Geological formation of India

- Peninsular India was a part of the old landmass since the formation of the Earth's crust.



- The Indo-Gangetic plain came into existence during the Tertiary Period.
- The Himalayas started to develop during the Pleistocene period

Which of the statements given above are incorrect?

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

78. Consider the following statements about Southwest Monsoons in India

- There may be dry spells in between rainy periods.
- These winds generally strike the Indian coast in the first week of June.
- It gives rainfall to all parts of India except the Coastal regions of Tamil Nadu and Andhra Pradesh.
- The Quantity of rainfall decreases as the monsoonal winds move towards the west over the northern plains.

How many statements given above are incorrect?

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

79. Consider the following pairs about vegetation and their available location in India

Vegetation	Region
Tropical Evergreen	Western Ghats
Temperate Evergreen	Central Parts of India
Thorny Forest	Rajasthan
Dry Deciduous Forests	Northeast India

How many pairs given above are correct?

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

80. Consider the following statements

- These soils are locally termed as reh, kallar and usar.
- This soil is generally infertile and unfit for agricultural use.
- These soils are mostly found in areas with a dry climate and poor drainage

Which one of the following Soils best applies to the above statements?

- Arid Soils
- Saline Soils
- Peaty Soils
- Laterite Soils

81. Consider the following statements about Karewa formation

- They are the lacustrine deposits of sand, clay, loam, silt and boulders.
- The Kashmir Himalayas are famous for Karewa formations
- They are useful for the cultivation of Saffron, Almond and Walnut.

How many statements given above are correct?

- Only one
- Only two
- Only three
- None

82. Which of the following statement best describe 'Karakoram Anomaly'?

- In recent times, there was an abnormality in the existing Line of Control runs from Manawar in Jammu to Indira Col on the trijunction in the Karakoram Mountain rang
- Although it is a cold desert area, the Karakoram Mountain Range is home to some rare and threatened species of flora and fauna
- Recently, both the Indian and Chinese troops completed the process of disengagement from Patrolling Point near Karakoram in the Eastern Ladakh sector
- Few pockets of glaciers in the Karakoram Range are resisting glacial melt due to global warming

83. Consider the following raw materials

- Latex
- Lac
- Willow
- Jute
- Silk

How many of the above are plant derivatives?

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

84. Consider the following statements

- Bhor Ghat joins Nashik with Mumbai
- Shencottah Pass joins Kottayam with Madurai
- Haldighat joins Rajsamand and Udaipur
- Thal Ghat joins Mumbai with Pune

How many pairs given above are correct?

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



85. In the second stage of the nuclear power programme, the thorium mat is used in the nuclear reactors. The fuel rods in such reactors are fabricated with Molybdenum and Zircon. In this context, which of the following states provides a one-stop destination for mining all the 3 minerals?

- (a) Andhra Pradesh
- (b) Odisha
- (c) Tamil Nadu
- (d) Gujarat

86. Consider the following statements

1. In the winter season, the upper air westerly jet streams are bifurcated into two branches over the Indian subcontinent.
2. The strength of the westerly jet stream contributes to the intensification of high pressure formed over the southern Indian Ocean during summer.

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

87. Consider the following statements about Alluvial soils of India

1. Khadar soils are the new alluvial deposits which are lighter in colour and have a sandy texture
2. Khadar is deposited near the riverbanks while Bhangar found away from the banks of the river on higher interfluvial zones
3. At the foothills of the Himalayas, Bhabhar soils are found, which are characterized by pebbles and swamps
4. Sal forests are predominant in Terai belt

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

88. In general, a sustained Positive value of Southern Oscillation indicates

1. Dry weather conditions in Southeast Asia
2. A warm Peru Current
3. Good Southwest Monsoon
4. A rise in depth of thermo-cline in the western half of the Pacific Ocean

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

89. Consider the following statements about Red soils in India

1. The texture of the soil varies from sand to clay and loam
2. In general, these soils are rich in lime, phosphate, magnesia, nitrogen, humus, and potash
3. In Uplands, the soil is coarse and infertile, while in Plains, the soil is fine and fertile.

Which of the statements given above are correct?

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

90. With reference to the climate of India, the retreat of Southwest Monsoon winds takes place due to

- (a) The apparent shift of the sun from the equator towards the Tropic of cancer
- (b) The weakening of low-pressure area over the north-western parts of India
- (c) The origin of severe cyclonic storms in the Bay of Bengal
- (d) The shifting of the high-pressure area to the south Indian ocean

91. Consider the following pairs about soil type and major crop grown

Soil type	Crop
Laterite soil	Cashew nuts
Sub-montane soil	Rice
Red soil	Ground nut
Black soil	Cotton

How many pairs given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

92. Consider the following statements about Bamboo

1. Bamboos are fast-growing perennial plants
2. In India, bamboo is found naturally almost throughout the country except in the Kashmir region
3. Odisha and West Bengal account for more than 70% of the bamboo resources of the country

How many pairs given above are correct?

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

93. Consider the following statements

1. In India, Northeast Trade winds are essentially sea-bearing winds.





2. In India, Southwest Trade winds are essentially land-bearing winds

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

94. Consider the following ocean currents

- 1. Labrador current
- 2. Kuroshio
- 3. Benguela current
- 4. Falkland current

How many of the above are cold ocean current?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

95. Consider the following statements about Goldilocks zone

- 1. It is a habitable zone around a star where it is not too hot and not too cold for liquid water to exist
- 2. Venus and Mars are also part of the Goldilocks zone in our solar system.
- 3. The celestial bodies within the Goldilocks zone must have an atmosphere.

How many statements given above are correct?

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

96. Consider the following countries

- 1. Morocco
- 2. Niger
- 3. Zambia
- 4. Libya

How many of the above are part of Sahel region of Africa?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

97. Consider the following statements about 'Steel Slag'

- 1. Its use in road construction increases its durability and reduces the cost of construction
- 2. Surat has become the first city in the country to get a road constructed with processed steel slag
- 3. It can be used to treat acidic water discharges from abandoned mines.
- 4. It is mainly recommended for its longevity as its lifespan is higher when compared to a concrete or cement road.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

98. Consider the following statements about Minor minerals in India

- 1. It is the second largest extractive industry on the planet, after water.
- 2. Their regulatory and administrative powers to frame rules, prescribe rates of royalties, etc., are entrusted with both state and central government
- 3. Examples of minor minerals include sand, marble and dolomite
- 4. State governments have the power to include any mineral into minor minerals list

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

99. Consider the following statements about vegetation in Himalayan ecosystem

- 1. Himalayas are devoid of deciduous forests
- 2. The vegetation cover of the southern slopes of the Himalayas is thicker than northern slopes
- 3. Evergreen broad-leaf trees like oak and chestnut are predominantly found in the hilly areas of the western Himalayas.
- 4. Namdapha national park has all types of vegetations located in Eastern Himalayas

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

100. Consider the following statements about the conditions necessary for recognition of a planet

- 1. It must orbit a star
- 2. It must be big to have enough gravity to force it into a spherical shape
- 3. It should have enough gravity to clear away any other objects near its orbit around the star.
- 4. It should not move away from the star

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four



### ANSWER KEY: GEOGRAPHY 2024

Q.NO	KEY	Q.NO	KEY	Q.NO	KEY	Q.NO	KEY
1	C	26	C	51	D	76	A
2	B	27	B	52	D	77	C
3	C	28	B	53	C	78	A
4	B	29	C	54	A	79	B
5	B	30	D	55	A	80	B
6	D	31	B	56	A	81	C
7	C	32	D	57	D	82	D
8	A	33	A	58	D	83	C
9	A	34	A	59	B	84	B
10	A	35	D	60	A	85	C
11	A	36	C	61	C	86	A
12	D	37	B	62	B	87	D
13	C	38	B	63	C	88	B
14	C	39	A	64	A	89	B
15	A	40	C	65	A	90	B
16	C	41	C	66	C	91	D
17	B	42	C	67	A	92	B
18	B	43	B	68	B	93	D
19	C	44	B	69	C	94	C
20	B	45	C	70	D	95	B
21	C	46	B	71	C	96	A
22	A	47	C	72	B	97	C
23	C	48	C	73	A	98	B
24	D	49	C	74	C	99	B
25	C	50	B	75	B	100	C

### CSAT GRAND TEST - 1

1. How many natural numbers upto 2050 are neither perfect squares nor perfect cubes?

- a) 1966
- b) 1978
- c) 1996
- d) 1990

2.  $P = 1! + 2! + 3! + \dots + 60!$

Which of the following can be concluded?

- a) P is a perfect square but not a perfect cube.
- b) P is a perfect cube but not a perfect square.
- c) P is a perfect square as well as a perfect cube.
- d) P is neither a perfect square nor a perfect cube.

**Directions for questions 3 to 75:** Each question is followed by two statements, I and II. Answer each question using the following instructions:

Choice (A) if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.

Choice (B) if the question can be answered by using either statement alone.

Choice (C) if the question can be answered by using both statements together, but cannot be answered by using either statement alone.

Choice (D) if the question cannot be answered even by using both the statements together.

3. x, y, z are three consecutive prime numbers. What are the values of x, y, z?

I.  $y - z = 4$ ,  $x - y = 6$

II.  $x < 60$

- a) A
- b) B
- c) C
- d) D

4. A number k has three prime factors 2, 5 and 3. What is the value of k?

I. Number of factors of k is 12

II. k is a multiple of 4

- a) A
- b) B
- c) C
- d) D



5. Haritha leaves from a certain point at 8:00 a.m. at a speed of 25 kmph. Karuna leaves from the same point at 9:30 a.m. at a speed of 37.5 kmph in the same direction as Haritha. At what time and how many kilometres from the starting point do they meet?

- a) 12:45 p.m., 122.5 km
- b) 12:30 p.m., 122.5 km
- c) 12:30 p.m., 112.5 km
- d) 12:45 p.m., 112.5 km

**Directions for questions 6 to 8:** These questions are based on the information given below.

There are 3 stretches in a race – X, Y and Z, each of which is 4 km long. The following table shows the mode of coverage of each stretch and the maximum and the minimum speeds of covering them.

Stretch	Coverage Mode	Minimum Speed (in kmph)	Maximum Speed (in kmph)
X	Bicycle	20	25
Y	Motorcycle	40	50
Z	Car	50	75

Each stretch is covered at a constant speed. The previous record in completing the race was 22 minutes.

6. Ajay travelled at the minimum speed by bicycle as well as motorcycle. If he did not break the previous record, his speed (in kmph) over stretch Z cannot exceed.

- a) 60
- b) 50
- c) 40
- d) 30

7. Ajay travelled stretch X taking the maximum possible time. The time taken for him to cover stretch Z is 662/3% less than the time taken to travel stretch X. If he took 46/11% less time to complete the race than the previous record, then find the speed at which he has travelled stretch Y (in kmph).

- a) 42
- b) 44
- c) 46
- d) 48

8. Ajay's overall average speed is 450/11 kmph. His speed over stretch X was 5/12th of his average speed over the stretches Y and Z together. Find his speed over stretch X (in kmph).

- a) 25
- b) 35
- c) 45
- d) 55

9. 30 men working 7 hours per day can do a piece of work in 18 days. In how many days can 21 men working 8 hours a day do the same piece of work?

- a) 223/5
- b) 222/5
- c) 221/2
- d) None of these

10. A can complete a piece of work in 40 days and B in 60 days. A started the work, worked for two days and then B took over from him, B then worked for the next two days and then A took over from him again and this process continued till the completion of the work. In how many days was the work completed?

- a) 40
- b) 42
- c) 48
- d) 54

**Directions for questions 11 to 12:** Each question is followed by two statements, I and II. Indicate your responses based on the following directions:

Mark (A) if the question can be answered using one of the statements alone, but cannot be answered using the other statement alone.

Mark (B) if the question can be answered using either statement alone.

Mark (C) if the question can be answered using statements I and II together but not using I or II alone.

Mark (D) if the question cannot be answered even using statements I and II together.

11. A water pump functions at a uniform rate. How long does it take to fill the tank?

1. The water pump is switched on at 8:00 a.m.
2. By 9:30 a.m., 3/8th of the tank is filled by the pump. By 11.00 a.m. 3/4th of the tank is filled by the pump.

Select the correct answer

- a) A
- b) B
- c) C
- d) D

12. In how many days can a man make 100 pots?

1. A man, a woman and a child together make 10 pots a day, while a woman and a child together can make 15 pots in 3 days.
2. 10 men together take 1 more day than 25 children to make 100 pots. A man can make twice as many pots as a child in a day.

Select the correct answer

- a) A
- b) B
- c) C





d) D

13. Two trains have lengths of 500 m and 600 m. They are running on parallel tracks in opposite directions. Find the total distance travelled (in m) by the trains from the time they start crossing each other to the time they completely cross each other.

- a) 100
- b) 1100
- c) 2200
- d) Cannot be determined

14. The distance between two stations P and Q is 120 km. A train starts from P to Q at 9 a.m. with a speed of 40 kmph while another train starts from Q to P at a speed of 40 kmph at 10 a.m. After one hour, the first train halts for 15 minutes at a station before it continues the journey while the second train does not halt anywhere. At what time do the two trains meet?

- a) 11:00 a.m.
- b) 11:15 a.m.
- c) 11:07:30 a.m.
- d) 11:12:30 a.m.

15. Rohan and Sohan started running simultaneously in opposite directions from a point on a 900 m long circular track at 15 m/sec and 10 m/sec respectively. Whenever they meet, they exchange their speeds and continue to travel in the same directions. Find the shortest distance (in m) between Rohan and Sohan along the track when Rohan completes  $41\frac{1}{2}$  rounds.

- a) 100
- b) 125
- c) 150
- d) 175

16. In country C, clocks are manufactured in a special way. The total area covered by the hours hand in 4 days is  $\frac{3}{16}$ th of the total area covered by the minutes hand in one day. Find the ratio of the lengths of the minutes hand and hours hand.

- a) 3 : 4
- b) 4 : 3
- c) 9 : 16
- d) 16 : 9

17. The average age of all the girls in a class of 42 students is 13 years. The average age of all the boys as well as the average age of 23 of the boys of the same class is 16 years. Which of the following could be the average age of the students in the class? (in years)

- a) 13.5
- b) 14
- c) 14.5

d) 15

18. In a school there are a total of 50 students in class X, who are divided into three sections A, B and C. Sections A and B have an equal number of students. All the students of the class wrote a test. The average marks obtained by the students of sections A and B together is 52.5. The average marks obtained by the students of sections A and C together is 60. The average marks obtained by the students of sections B and C together is 70. The average marks obtained by the students of sections A, B and C together is 60. How many students are there in section C?

- a) 10
- b) 20
- c) 15
- d) Cannot be determined

19. If 10 cu.cm of ink can write, on an average, 340 words, how many words can one write with a quarter pint (1 pint = 0.568 litres) of ink?

- a) 4,828
- b) 8,484
- c) 19,312
- d) 24,467

20. Two containers A and B contain equal volumes of water and alcohol respectively. 3 litres of water is taken from A and poured into B. From the resulting solution in B, 3 litres is taken out and poured into A. If the quantity of water in both the containers is the same after the two transfers find the volume of alcohol in B initially (in litres).

- a) 12
- b) 9
- c) 6
- d) 3

**Directions (21 to 25)** Truthfulness is inherently life-enhancing. Not only does it simplify our interactions with one another, it also is dignifying and even ennobling. For in sharing the truth with another person, we affirm that person's intrinsic worthiness. Above all, through truthfulness, we participate in truth itself.

We can readily observe the chaotic effect of untruthfulness in daily life, especially among our leaders. Politics has become almost synonymous with lying and cheating. Big business is another area where lying is considered expedient, lest the truth should require better business standards or an ecological conscience and hence cut into the all-pervasive profit margin.

But lying may go even deeper than that. Two and a half millennia ago, the Greek philosopher Plato wondered in his Republic whether one could contrive a "noble lie" that would carry enough conviction for a whole community. In fact, such a core lie is operative in our society. That lie is the belief,



spawned by scientific materialism, that life is one-dimensional and that all talk about a higher Reality is mere fantasy.

From this central lie, springs an entire outlook on life that deprives us of our participation in the higher dimensions of existence and thus of our human dignity. For as long as we think and reinforce in each other the belief that we are only meat bodies destined to vanish into nothingness at the hour of death, we are living a lie that diminishes us incisively.

Little wonder that truthfulness has traditionally been celebrated as the highest moral virtue, and the foundation of all other virtues. Thus, in the Mahânirvâna-Tantra, composed nearly one thousand years ago, we find the following declaration:

Without truthfulness, worship is futile. Without truthfulness, recitation is useless. Without truthfulness, asceticism is as unfruitful as seed in barren soil. Truly, truthfulness is the best asceticism. All actions should be rooted in truthfulness. Nothing is more excellent than truthfulness.

This expresses a sentiment that once was global but that, today, is generally little more than a pretty saying. However, the spiritual traditions of the world, notably Yoga, contain many poignant considerations of the nature of truth and truthfulness, which have lost none of their relevance.

For the traditional yogi, truthfulness is a manifestation of Truth, otherwise referred to as "the ultimate Reality" or "the Divine." By being truthful in our words, actions, and even our thoughts, we are automatically true to our own higher nature, which is the ultimate Truth.

According to Yoga, everything is a manifestation of the ultimate Reality anyway, but this fact is not obvious to us so long as we are under the spell of spiritual ignorance. Therefore, while we are subject to this spell, we automatically live inauthentic lives. To put it bluntly, we live a lie. The lie consists of the illusion that we are a limited body-mind that needs to fear death and that is separate from all other equally limited and fearful body-minds. Thus, even when we attempt to be truthful, our truthfulness is circumstantial rather than radical, because we fail to know our own true nature. Only when we are in touch with Reality can we be completely truthful in any situation.

Truthfulness in words, actions, and thoughts is the moral foundation upon which Yoga practitioners must build their temple of spiritual discipline and conscious living. Through steady practise of this virtue, they gradually let go of the big lie at the core of ordinary (unenlightened) human existence and discover who they truly are.

These thoughts seem almost outlandish to our modern mind, which is so used to a wide variety of deceptions. It is no exaggeration to say that we are surrounded by pretense and lies – from advertising to politics to interpersonal relationships. For many of us truth is what is expedient in the moment.

21. The author vociferously preaches
  - a) Truthfulness.
  - b) The tenets of Yoga.
  - c) Asceticism.
  - d) Conscious living.
22. One of the following is a core lie as understood from the passage:
  - a) One that can convince an entire community.
  - b) It is a noble lie which is believed by people to be beneficial.
  - c) The impossibility of one's participation on spiritual materialism.
  - d) The belief that life is all about materialism only.
23. The most important task to be done as we start on our spiritual journey is to
  - a) Try being true to our own higher nature.
  - b) Be true to oneself.
  - c) Lead an authentic life.
  - d) Realise that we are not meat bodies only.
24. According to Mahanirvana Tantra
  - a) Yoga has aspects of nature of truth and truthfulness integrated into it.
  - b) An ascetic need to have genuine intentions.
  - c) Truthfulness is the highest moral virtue.
  - d) Truthfulness is not being recognised globally as a powerful tool to be used in one's salvation.
25. The author accuses
  - a) politicians of lying and cheating.
  - b) business sector of justifying untruths as a way of making profits.
  - c) our tendency towards materialism as taking us away from the spiritual path.
  - d) All of the above.

**Directions (26-28)** Three persons Shiva, Jagan and Rohit aim at a target. Their respective probabilities of hitting the target are  $\frac{2}{3}$ ,  $\frac{5}{7}$  and  $\frac{3}{8}$ . What is probability that

26. none of them hits the target?
  - a)  $\frac{7}{92}$
  - b)  $\frac{5}{28}$
  - c)  $\frac{5}{84}$
  - d)  $\frac{10}{198}$
27. at least two of them hit the target?
  - a)  $\frac{9}{14}$
  - b)  $\frac{107}{168}$
  - c)  $\frac{77}{168}$
  - d)  $\frac{79}{84}$



28. exactly one of them hits the target?

- a) 17/56
- b) 107/168
- c) 5/28
- d) 23/28

29. If an unbiased coin is flipped 7 times, the probability that the same face shows up in exactly any four consecutive flips is \_\_\_\_\_.

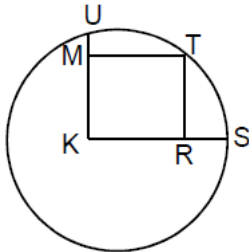
- a)  $\frac{1}{2}$
- b)  $\frac{1}{8}$
- c)  $\frac{3}{16}$
- d)  $\frac{35}{128}$

30. The odds against an event A are 3 to 2 while the odds in favor of another independent event B are 2 to 5. The probability that at least one of them would happen is \_\_\_\_\_.

- a)  $\frac{5}{7}$
- b)  $\frac{2}{7}$
- c)  $\frac{4}{7}$
- d)  $\frac{3}{7}$

**Directions for questions 31 and 32:** These questions are based on the information given below.

In the figure, K is the centre of the circle, T is a point on the circumference of the circle and MKRT is a square.



31. Find the ratio of the perimeter of the square MKRT and the circumference of the circle.

- a)  $7\sqrt{2} : 11$
- b)  $7 : 11$
- c)  $7 : \sqrt{2}$
- d)  $7 : 22$

32. Find the ratio of the area of the square MKRT and the area of the circle.

- a) 1 : 4
- b) 7 : 22
- c) 7 : 44
- d) 14 : 33

33. An ivy league management institute prohibits for two years its retired faculty from joining examination preparation institutes that prepare students for the management entrance exam of the institute and other similar institutions. One faculty member commented that

the prohibition was unfortunate since it would prevent retired faculty from earning a livelihood for two years.

The comment is based on the assumption that

- a) A faculty member must be paid an allowance to compensate for the restriction imposed post-retirement.
- b) Faculty members on retirement should be retained as guest faculty and paid per class.
- c) Intellectuals retiring from senior positions are incapable of transferring their knowledge to another field.
- d) The institute has no right to impose its will on employees once they retire.

### Directions 34-36

The first time I took a calligraphy course was about a year ago, and the decision was quite hard. I was sure that it would be painstaking and that I would need excellent handwriting to learn the art. How mistaken I was! But, I have better understood what calligraphy *is* by understanding what it *is not*. It is not *just* about decorated text, nor is it only about the use of letters as ornaments. True, calligraphic letters and pages are very often dressed up with some form of decoration; gold color, pattern, pictures, flourishes etc. but this ornamental layer only decorates the underlying FORM. There is a big difference between a beautiful *form* and a beautiful *ornament* on the top of the form. Calligraphy is about symbols themselves being beautifully formed and arranged. Naked, undecorated calligraphy should look good just as it is, in the same way that athletes, models, and healthy people would look good without their clothes on.

Is calligraphy beautiful handwriting? Not exactly and not entirely. It is more than just that. It is true that the derivation of the word translates simply as 'beautiful writing'. But the word has taken on a larger meaning. Bear in mind that the first goals of handwriting are to be quickly and easily written and accurately read. Beauty, personality and artistic impact are not as important in handwriting as are clarity and speed. So, although calligraphy is a kind of handwriting, and some handwriting is calligraphic in appearance, they are not the same. It is the difference between 'writing as an art form' and 'artistic-looking handwriting'. Calligraphy aims to produce an 'art' reaction, in which a deeper meaning is communicated from artist to viewer, and the viewer feels invited to think a new thought in response. Handwriting, by contrast, aims to be read.

34. The central idea of passage is that

- a) Writing as an art form attains the level of calligraphy only with proper decoration.
- b) The art of calligraphy lies in clarity, even without much or any decoration.





- c) Calligraphy has not remained a popular art form because of its intricacies of decoration and clarity.  
d) Calligraphy is a tangential art form because its decoration has to gain precedence over clarity.
35. The author mentions 'athletes, models, and healthy people' to indicate that
- Calligraphy uses symbols that are not generally used even in beautiful handwriting.
  - Nakedness without any ornamentation is a form of calligraphy.
  - The art of calligraphy is not so much an ornamentation of letter as it is beautiful rendering of letters.
  - Use of ornamentation spoils the clarity, the very aim of handwriting.
36. The author's conclusions about calligraphy are based on the assumption that
- The more ornamental one's writing is, the more calligraphic his writing proves to be.
  - Good form in writing facilitates clarity of handwriting, making reading a pleasant experience.
  - Calligraphy is an art form that should be encouraged despite the painstaking nature of the art.
  - Calligraphy is just one facet of handwriting that has clarity and ornamentation.
37. How many numbers between 4000 and 6000 can be formed using the digits 1 to 6, when any digit can occur any number of times?
- 864
  - 432
  - 638
  - 126
38. Ten points are plotted in a plane such that no three of them lie on a straight line. Four of these points are joined to each of the remaining six points and each of the remaining six points is joined to exactly five points. How many line segments are formed?
- 27
  - 25
  - 29
  - 24
39. The number of positive integral solutions of the equation  $x + y + z + t = 25$  is \_\_\_\_\_.
- 2024
  - 2042
  - 2204
  - 2402

40. A certain number of students of a school have participated in the chess tournament of their Annual Sports Meet. It was found that in 105 games both the players were girls and in 300 games both the players were boys. The number of games in which one was a girl and the other was a boy is \_\_\_\_\_.
- 500
  - 600
  - 375
  - 210

**Directions for questions 41 to 43:** These questions are based on the following information.

There are nine members – Anup, Bagha, Dulal, Elena, Fuli, Gopal, Harsh, Indira and Ketan, in a Kho-Kho team.

All are sitting in a row, such that any two adjacent people are facing opposite directions. Elena is adjacent to Indira and Anup. Ketan is adjacent to Fuli and Gopal. Bagha and Dulal are facing the same direction, where Bagha is sitting to the left of Dulal. Harsh is sitting to the immediate right of Anup.

41. Who does not sit at any of the ends?
- Bagha
  - Fuli
  - Dulal
  - Indira
42. If Fuli is facing south, then who among the following will face North?
- Dulal
  - Harsh
  - Elena
  - None of these
43. What is the minimum number of people that can sit between Bagha and Indira?
- 0
  - 2
  - 3
  - More than 3

**Directions for questions 44 to 47:** These questions are based on the following information:

125 small and identical cubes are numbered using only odd numbers from 1 to 249 (in that order) and are assembled together to form a larger cube.

- The front face is laid out first from the bottom row left to right, then the row above it left to right and so on.
- This process is continued until the rear face is laid out in a similar manner.

44. What is the sum of the series of numbers starting from the bottom left cube on the rear face to the top right cube of the rear face?

- a) 1000
- b) 1025
- c) 1125
- d) 1250

45. What is the sum of the series of numbers forming the body diagonal starting from the top right corner of the front face to the bottom left corner of the rear face?

- a) 625
- b) 525
- c) 645
- d) 650

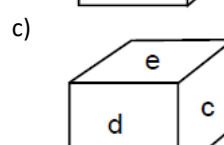
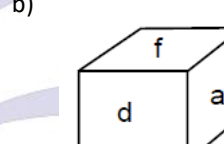
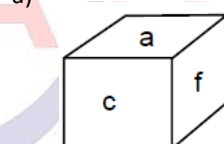
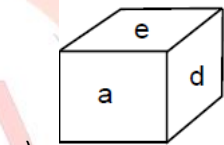
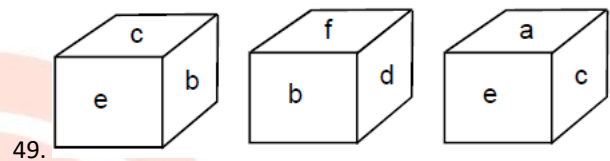
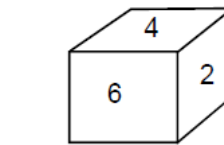
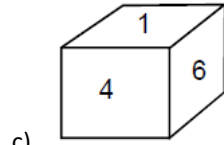
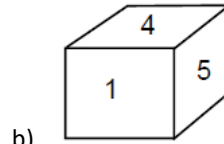
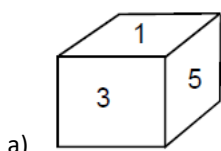
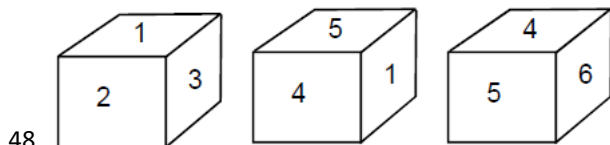
46. What is the sum of numbers starting from the cube at the center of the front face to the cube at the center of the rear face?

- a) 625
- b) 525
- c) 645
- d) 650

47. What is the sum of the series of numbers forming the face diagonal on the right side, starting from top right corner of the front face to the bottom right corner of the rear face?

- a) 625
- b) 525
- c) 645
- d) 650

**Directions for questions 48 and 49:** In each of the questions, three views of a cube are given. In the options another 4 views of the same cube are given, one of which is wrong. Identify the choice which contains the wrong view and mark it as your answer. The letters/numbers shown on the faces in the diagrams are used only to identify the respective faces in the diagrams, but are not printed or painted on the faces of the cubes.



**Directions for questions 50 to 53:** These questions are based on the following information.

Four wealthy people – Oswald Henry, Princess Stephanie, Gennady Yuganov and Henry Ford III each bought one of our different classic watches – a Louis Ulysse Chopard, a Breguet Dupuis, a Piaget Sunmaster and a Rolex Mercator at the annual Sotheby's auction. The following information is available about the person, the watch purchased and their prices.

- i) The total amount paid for these four watches was \$8,40,000 and the costliest watch was priced \$1,20,000 more than the cheapest.
- ii) Oswald did not purchase the costliest watch and neither did he purchase a Piaget.
- iii) Gennady did not buy the costliest or the cheapest watch but had paid \$1,80,000 for his watch.
- iv) The Rolex Mercator is the costliest and the Chopard the cheapest among the watches.
- v) Princess Stephanie purchased the Breguet Dupuis and had paid \$40,000 more than what Gennady Yuganov had paid.

50. Which watch did Oswald Henry purchase and at what price?

- a) Louis Ulysse Chopard at \$2,20,000.
- b) Rolex Mercator at \$1,80,000.
- c) Louis Ulysse Chopard at \$1,60,000.
- d) Rolex Mercator at \$1,60,000.

51. What is the difference in the cost of the watches purchased by Henry Ford III and Gennady Yuganov?

- a) \$80,000
- b) \$1,00,000
- c) \$1,20,000
- d) \$1,10,000

52. Which of the following statements is true?

- a) Princess Stephanie bought the cheapest watch.
- b) Oswald Henry did not purchase the Louis Ulysse Chopard.
- c) Henry Ford III bought a watch that was priced \$60,000 more than the Piaget Sunmaster.
- d) The watches bought by Oswald Henry and Henry Ford III cost more than the watches bought by Gennady Yuganov and Princess Stephanie.

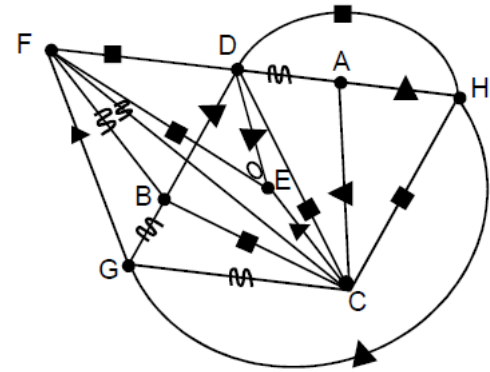
53. Which of the following watches was purchased by Gennady Yuganov?

- a) The watch that was priced \$40,000 less than the one bought by Henry Ford III.
- b) The watch that was the cheapest of all.
- c) The watch that was called Piaget Sunmaster.
- d) The watch that was called Breguet Dupuis.

**Directions for questions 54 to 56:** These questions are based on the diagram given below.

Eight different cities A through H are, connected by different modes of transport and all are two-way connections, while travelling from one city to other one should not visit any city more than once.

Modes of transports:



Modes of transports:

- By train
- ▲— Road
- AA— Air

54. Which is the only mode of transport that would help one to reach from G to D?

- a) Train
- b) Air
- c) Road
- d) None of these

55. At most how many intermediary cities one can visit while traveling from G to F by using exactly two modes of transport?

- a) 3
- b) 4
- c) 5
- d) 6

56. At most how many intermediary cities one can visit while traveling from C to F by using exactly one mode of transport?

- a) 2
- b) 3
- c) 4
- d) 5

**Directions 57-59:** We humans have built a creativity machine. It's the sum of three things : a few hundred million computers, a communication system connecting those computers, and some millions of human beings using those computers and communications.

This creativity machine is the Internet. It has already changed the way we do science, most importantly by enhancing collaboration between researchers. The present day Internet provides convenient connections between computerized labs, simulations and research databases. It also represents an enormous financial investment that is driven by the demands of hundreds of millions of consumers. As such, the total Internet software and infrastructure investment dwarfs the budgets of scientific research programmes and even of many government defence programmes. And, more than





any megaproject of the past, the essence of the Internet is to provide coordinated processing of information. For researchers seeking resources, these are facts worth considering.

**For some disciplines, the Internet itself has become a research tool: grid computing has been used to exploit the power of millions of Internet – connected machines.**

Building on the popularity of SETI@home – an experiment that uses Internet – connected computers to search for extraterrestrial intelligence – and prime number hunts, there are now physics, medical and proteomics projects enlisting the enthusiasm of people (and their computers) across the world. For linguists and sociologists, new questions can be investigated simply by observing what occurs on the publicly available Internet. Even experimental sociology is possible: in their study of social influence on music preference, Salganik et al, recruited more than 14,000 subjects through a popular-website, ran online trials on these subjects, and then obtained results directly from their experiment website.

The possibilities do not end there. Even online games are attracting academic interest. Some games have millions of players. MMORPGs (massively multiplayer online role-playing games,) such as World of Warcraft and EverQuest, feature vivid three dimensional action involving both cooperation and combat. Another genre of MMORPGs lack a significant combat or quest element and are more often called 'virtual worlds'. For example, the virtual world Second Life has the visual realism of many MMORPGs, but it exists as a venue for the participants rather than as a pre-designed adventure. Second Life provides a range of software tools, including a programming language that gives participants the power to create artifacts according to their own designs. Thus, the game depends on the skill and creativity of its participants to generate content. Such virtual worlds have already been used for educational projects, and are worthy of psychological and social research.

57. The primary purpose of the passage is to
- elaborate on the creativity machine called the Internet.
  - show how the Internet can be used as an amusement tool.
  - list the possibilities of the Internet in both academic research and entertainment.
  - demonstrate how the Internet, as a reliable source for information, can facilitate research and promote development of creative skills.
58. According to the passage, the Internet can help researchers in all the following ways EXCEPT:
- It builds coordination between researchers.
  - It provides a common source for researchers to gather information about their research projects.

- It reduces investment in research projects.
- It helps researchers conduct all kinds of experiments online.

59. According to the passage, what can be inferred from the proposition "the Internet itself has become a research tool"?
- Some scientists take up for research issues that investigate what happens on the Net.
  - The Internet forms a grid of computers so that the researcher can make use of the power of millions of Internet-connected computers to gather or share information.
  - The Internet makes experimental sociology possible.
  - Researchers in some disciplines can rely on the Internet to form a topic for their research, run surveys or experiments and get the results.

**Directions for questions 60 to 63:** These questions are based on the following information. Bond went to a showroom to buy a super-bike. He asked the executive about the details of the six bikes - Kamikaze, Killer, Diablo, DMG, Perro and Stiletto.

The executive gave the following information.

- Diablo is stronger and faster than Stiletto but cheaper than DMG.
- Killer is the costliest bike and less stronger than Perro, which is less stronger than DMG.
- Kamikaze is the fastest bike and stronger than Diablo but less stronger than Killer and costlier than DMG.
- Perro is less costlier than Diablo but costlier than Stiletto and faster than DMG, which is faster than Killer, which is the slowest bike.

60. Which of the following is the strongest bike?
- Perro
  - Killer
  - DMG
  - Kamikaze
61. Which of the following can be the order of bikes from the fastest to the slowest?
- Kamikaze, Diablo, Killer, Stiletto, Perro, DMG.
  - Kamikaze, Stiletto, Diablo, DMG, Perro, Killer.
  - Kamikaze, Diablo, Stiletto, Perro, DMG, Killer.
  - Kamikaze, Diablo, DMG, Stiletto, Killer, Perro.
62. Which of the following cannot be ranked second in any of the three comparisons? (E.g. the fastest bike is ranked first and the slowest is ranked the sixth, in that order)?
- Stiletto
  - Diablo
  - Kamikaze



d) Perro

63. If Bond bought a bike which is costlier and stronger than the Kamikaze, then he must have bought the

- a) Stilletto.
- b) Perro
- c) DMG.
- d) Killer.

**Directions for questions 64 to 67:** These questions are based on the data given below.

Four teams are to be formed from fourteen persons. A team must consist of at least two persons and no two teams can have the same number of persons. Each person can be a member of exactly one team. Each of Rama, Ramya, Radha and Raksha must be a member of a different team. Each of Rohini, Padma, Priya and Priyanka must be a member of a different team. Pratima, Pratibha and Sudha must be in the same team. Shreya and Shalini must be in the same team. Rama cannot be in the same team with any of Padma, Priya and Priyanka. Ramya can be in the same team with neither Priyanka nor Priya. Radha cannot be in the same team with Priyanka. Swetha is in one of the teams.

64. How many possible ways are there to form the four teams?

- a) 24
- b) 120
- c) 64
- d) 6

65. Which of the following statements is not definitely true?

- a) Swetha is in a three-member team.
- b) There is a two-member team.
- c) Sudha is in a five-member team.
- d) Shreya is in the two-member team.

66. Which of the following additional statements is sufficient to know the composition of teams?

- a) Rohini and Padma are in teams with five and four members respectively and Radha is not in a three-member team.
- b) Sudha and Shalini are in teams with five and four members respectively and Swetha is not in a two member team.
- c) Pratima and Swetha are in teams with five and three members respectively and Shreya is not in a two member team.
- d) None of these

67. Who of the following must be a member of a five-member team?

- a) Priya
- b) Priyanka

- c) Pratima
- d) Shreya

68. Deepika: Now is the time to invest in a flat or a plot— real estate prices should not increase during the next six months unless interest rates drop significantly. Ankur: I disagree. Three years ago interest rates fell significantly but real estate prices did not increase at all. It can be inferred from the above exchange that Ankur has interpreted Deepika's statement to mean that

- a) Interest rates are the only significant economic factor determining real estate prices.
- b) Interest rates are likely to fall significantly in the next six months.
- c) Real estate prices are directly proportional to interest rates.
- d) If interest rates fall, real estate prices must rise.

69. The fact that the pictures of Taj Mahal are found even on chocolate-boxes seems to reduce the aesthetic value of the Monument. Many tourist guide books seem to entreat us to read Mughal Emperor Shah Jahan's mausoleum as the world's greatest monument of love. Like those of Mona Lisa, the imitations of Taj Mahal certainly downgrade value of the Monument. Which of the following, if true, would most seriously undermine the validity of the above conclusion?

- a) When you arrive in Agra every hawker peddles imitations of Taj of every size and price to make the familiarity-breeds-contempt problem worse.
- b) Recently a British friend making his first trip to India decided to leave the Taj off his itinerary because of its over-exposure.
- c) A piece of art is imitated and branded most because of its insurmountable beauty.
- d) One's imagination of Taj is tarnished by cruel tales of the master mason's hands being cut off so he would never build anything lovelier.

70. In a shower, 5 cm of rain falls. The volume of water that falls on 1.5 hectares of ground is:

- a) 75 cu. M
- b) 750 cu. M
- c) 7500 cu. M
- d) 75000 cu. M

71. Artists are generally whimsical. Some of them are frustrated. Frustrated people are prone to be drug addicts. Based on these statements which of the following conclusions is true?

- a) All frustrated people are drug addicts
- b) Frustrated people are whimsical
- c) All drug addicts are artists
- d) Some artists may be drug addicts



72. Some mountains are hillocks. Some mountains are rivers. Some mountains are valleys.

Conclusions:

1. All mountains are either hillocks or rivers or valleys
2. No valley is river
3. Some river are valleys

Select the correct answer

- a) None follows
- b) Only 1 follows
- c) Only 2 and 3 follow
- d) Only 3 follows

**Direction 73 to 75:** Two Statements I and II are given. These statements may be either independent causes or may be effects of independent causes or a common cause. One of these statements may be the effect of the other statements. Read both statements and decide which of the following answer choice correctly depicts the relationship between these two statements:

73. Statement I. A large number of Primary Schools in the rural areas are run by only one teacher.

Statement II. There has been a huge dropout from the primary schools in rural areas.

- a) Statement II is the cause and Statement I is its effect
- b) Statement I is the cause, and statement II is its effect
- c) Both statements I and II are independent causes
- d) Both statements I and II are effects of independent causes

74. Statement 1: The company has decided to increase the salary of its employees.

Statement 2: The employees threatened to go on a strike if their demands for a salary hike were not met.

- a) Statement I is the cause and Statement II is its effect
- b) Statement II is the cause, and statement I is its effect
- c) Both statements I and II are independent causes
- d) Both statements I and II are effects of independent causes

75. I. There is sharp decline in the production of oil seeds this year.

II. The Government has decided to increase the import quantum of edible oil.

- a) Statement I is the cause and Statement II is its effect
- b) Statement II is the cause, and statement I is its effect
- c) Both statements I and II are independent causes
- d) Both statements I and II are effects of independent causes

## Directions 76-80

Centuries ago, "the commons" referred to the land where animals belonging to people in the community would graze. As the name implies, the commons did not belong to any one farmer. All were better off for having access to it.

Industries too have commons. A foundation for innovation and competitiveness, a commons can include R&D know-how, advanced process development and engineering skills, and manufacturing competencies related to a specific technology.

Such resources may be embedded in a large number of companies and universities. Software knowledge and skills, for instance, are vital to an extremely wide range of industries. The knowledge, skills, and equipment related to the development and production of advanced materials are a commons for such diverse industries as aerospace, automobiles, medical devices, and consumer products.

More often than not, a particular industrial common will be geographically rooted. For instance, northern Italy is home to a design common that feeds, and is fed by, several design-intensive businesses, including furniture, apparel and household products. The geographic character of industrial commons helps explain why some companies in certain industries tend to cluster in particular regions.

What about the popular notion that distance and location no longer matter, or, as Thomas Friedman put it, "the world is flat"? While we agree with the general idea that geographic boundaries to trade are falling and that the global economy is more intertwined than ever, the evidence suggests that when it comes to knowledge, distance does matter. Detailed empirical work on knowledge flows among inventors shows that proximity is crucial. Other studies show that the main way knowledge spreads from company to company is when people switch jobs. Even in America's relatively mobile society, it turns out that the vast majority of job hopping is local.

This explains why commons persist in specific locations in an era when huge amounts of scientific data can be accessed easily from anywhere. For example, even though virtually all the raw data from the Human Genome Project is available electronically all over the world, the drug research it has generated is heavily concentrated in Boston, San Diego, and San Francisco areas.

Once an industrial common has taken root in a region, a powerful virtuous cycle feeds its growth.

Experts flock there because that's where the jobs and knowledge networks are. Firms do the same to tap the talent pool, stay abreast of advances, and be near suppliers and potential partners. Novartis, a Swiss pharmaceutical giant, for example chose to move its research headquarters from Basel, Switzerland, to Massachusetts, to be close to universities and research institutes that are global leaders in bio-sciences. These dynamics make it difficult for other regions that do not yet have a vibrant biotechnology





common to attract bio-tech companies, even with generous incentives.

76. The central idea of the passage is that
- a) The concept of commons is applicable more to tangible resources than to intangible resources.
  - b) Despite globalization, proximity is still a crucial factor, resulting in concentration of workforce and companies.
  - c) The localization of industries and companies result in economic disparities, which cannot be corrected even with generous incentives.
  - d) Industrial commons and commons in traditional sense are fundamentally similar because they allow free access to resources.

77. Which of the following sentences, if added to the third paragraph, would most logically continue the idea of the paragraph without intruding the flow of the idea in the passage?

- a) The commons nonetheless present some or other kind of benefit to the company.
- b) Being close to the commons is a source of competitive advantage.
- c) We, however, seldom ignore some irregularities in the process.
- d) Distance does play a role as per the following reasons.

78. Which of the following, if true, best explains the finding of the empirical work on knowledge flows given in the fourth paragraph?

- a) The explosion of internet and IT is so extensive that even tens of thousands of pages of scientific information can be transferred in seconds.

- b) The expansion of science and technology is quite rapid and the growth has been exponential during the last few decades.
- c) Much technical knowledge, even in hard sciences, is highly tacit and therefore far more effectively transmitted face-to-face.
- d) Companies in a certain industry do not need to be in a single location to share knowledge and information.

79. It can be inferred that the word 'this' in the first sentence of the fifth paragraph can refer to which of the following?

- a) Ease of sharing knowledge.
- b) Existence of commons
- c) Mobility in workforce
- d) Huge amounts of scientific data.

80. The Novartis example given in the last paragraph will become irrelevant to the context if which of the following assumptions is correct?

- a) Novartis had to spend millions of dollars for the relocation to Massachusetts, an amount far more than the money it would spend on research.
- b) Novartis is probably the only company that has shifted its total research operations to a totally new territory.
- c) Detroit became the hub of automobile industry because the raw material and skilled workforce needed are available in the surrounding areas.
- d) Factors other than research play a crucial roles in the profitability of Novartis, forcing the Company take major decisions.

### ANSWER KEY: CSAT GRAND TEST-01

Q.NO	KEY	Q.NO	KEY	Q.NO	KEY	Q.NO	KEY
1	C	21	A	41	B	61	C
2	D	22	D	42	A	62	A
3	D	23	A	43	A	63	D
4	C	24	C	44	C	64	A
5	C	25	D	45	A	65	D
6	A	26	C	46	A	66	A
7	D	27	B	47	C	67	C
8	A	28	A	48	C	68	A
9	C	29	C	49	D	69	C
10	C	30	C	50	C	70	B
11	A	31	B	51	B	71	D
12	B	32	C	52	D	72	C
13	B	33	C	53	C	73	B
14	C	34	B	54	C	74	A
15	C	35	C	55	D	75	A
16	B	36	B	56	B	76	B



# EKAM IAS ACADEMY, HYDERABAD

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17	D	37	B	57	D	77	B
18	A	38	A	58	D	78	C
19	A	39	A	59	D	79	C
20	D	40	C	60	C	80	D

