FWD

FORTUNE WEEKLY DIGEST

› Invasive Species

› Women Security & Empowerment Issues

› DDoS Attack

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FORTUNE WEEKLY DIGEST

EDITOR'S NOTE

As UPSC aspirants, it is essential to stay updated on current affairs to excel in the examination. This **Fortune Weekly Digest (ForWarD)** brings you the latest news and developments from around the world, carefully curated and analyzed to help you prepare for the Civil Services (Main) Examination.

We understand that time is precious, and we have made sure to present the information in a concise and easy-to-understand manner.

The magazine is divided into different sections. Mains relevant topics have been covered in detail with a UPSC previous year question perspective. The jot downs are examples and interesting facts to enrich your answer writing. Cherrypicks has some key words from the week, helpful again in answer writing and essay. We have also included essay topics and sample questions to help you guage your preparation.

We have designed this magazine to best supplement the daily current affairs notes we have launched by the name of **FIND (Fortune IAS News Daily)** and **FINDER (Fortune IAS News Daily Explainer)** and the **Fortune Prelims Precise** monthly compilation. This magazine will be explained in detail and your queries addressed in a live class we conduct.

At a time when there is no dearth of current affairs materials, our hope is help you get a one-stop solution for all your current affairs needs.

This magazine is a work in progress and your feedback will be appreciated.

We hope that this magazine will serve as a valuable resource for your exam preparation and contribute to your success in the UPSC examination.

I N D E X

MAKING BUREAUCRACY MODERN AND REPRESENTATIVE

Syllabus: GS II - Role of civil services in a democracy

PYQ MAPPING

Q) *"Traditional bureaucratic structure and culture have hampered the process of socio- economic development in India." Comment.* ***(2016)***

Q) *Initially Civil Services in India were designed to achieve the goals of neutrality and effectiveness, which seems to be lacking in the present context. Do you agree with the view that drastic reforms are required in Civil Services. Comment* ***(2017)***

Q) *"Institutional quality is a crucial driver of economic performance". In this context suggest reforms in Civil Service for strengthening democracy* ***(2020)***

SHORT TAKES

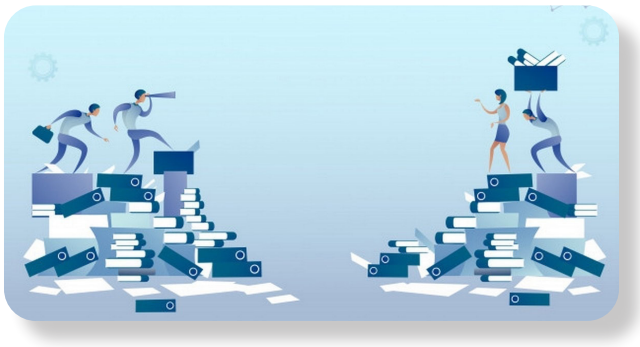
- **UPSC SC/ST/OBC Reservation Quota:** The UPSC reserves **15%** of its vacancies for Scheduled Caste (SC) candidates, **7.5%** for Scheduled Tribe (ST) candidates, and **27%** for Other Backward Classes (OBC) candidates.
- **UPSC Disability Reservation Policy**: The UPSC reserves **4% of its vacancies** for candidates with disabilities, **in alignment with the Rights of Persons with Disabilities Act, 2016**. This reservation covers various disabilities, including visual impairment, hearing impairment, locomotor disability, autism, intellectual disability, and multiple disabilities.
  - **Eligibility Criteria:** To qualify for the disability reservation benefits, candidates must have a **minimum of 40% disability** as specified by the UPSC.

WHY IN NEWS

A recent article by Vivek Katju, a retired IFS officer, highlights the Opposition Leader's criticism regarding the issue of lack of representation in the team responsible for the 2024 Budget proposals. The article notes that out of 20 members, only one was from a minority and another from the OBC category, raising concerns about the underrepresentation of marginalised groups in key economic policy decisions.

INTRODUCTION

Revamping bureaucracy is essential to keep pace with the evolving demands of society. By integrating modern technologies and ensuring diverse representation, we can create a more dynamic and responsive government. This transformation is key to bridging the gap between policy and the real-world needs of the population.



FACTS ON LOW REPRESENTATION OF SC/ST, OBC, PwBD IN CIVIL SERVICES

Data from Department of Personnel and Training (DoPT), 2022 December

- **SC/ST Representation at Senior Levels:** Scheduled Caste (SC) officers hold 4% and Scheduled Tribe (ST) officers hold 4.9% of the positions at the rank of Joint Secretary and Secretary in the Government of India.
- **OBC Representation at Senior Levels:** Out of 322 officers at the Joint Secretary and Secretary ranks, 39 (approximately 12%) belong to the Other Backward Classes (OBC) category.
- **Representation in Group A Posts:** As of January 1, SC officers represent 13.21%, ST officers 6.01%, and OBC officers 18.07% of Group A posts across 75 ministries and departments.

FACTS ON LACK OF MODERNISATION ON BUREAUCRACY

- **Limited RTI Integration:** The Right to Information (RTI) process is still not fully integrated with modern payment systems like UPI, leading to inefficiencies and delays in accessing information.
- **Outdated systems, infrastructure and processes:** Many bureaucracies rely on antiquated systems and procedures, leading to inefficiencies and delays.
- **Paper-based operations:** Excessive paperwork hinders productivity and increases the risk of errors and corruption.
- **Lack of digital infrastructure:** Inadequate IT infrastructure hampers the adoption of digital tools and services.
- **Resistance to change:** A culture of resistance to change within bureaucratic organisations can impede modernization efforts.
- **Silo Mentality**: Bureaucratic agencies often work in isolation from each other, leading to a lack of coordination and inefficient service delivery.
- **Skill gap:** A shortage of digitally skilled personnel can hinder the implementation of modern technologies and processes.
- **Regulator Mode**: The bureaucracy predominantly functions in a regulatory capacity rather than a facilitative one, hindering its ability to support and streamline processes effectively.

CHALLENGES OF SC/ST, OBC, PwBD IN CIVIL SERVICES

- **Dominance of Upper Castes**: Senior-level civil service positions are predominantly held by upper-caste individuals, limiting opportunities for SC/ST and OBC officers.
- **Low SC/ST Representation**: Representation of SC/ST officers at the Secretary and Joint Secretary levels is only 4% and 4.9%, respectively, indicating significant underrepresentation.
- **Lack of Reservation for Promotions**: The absence of reservation in promotions within Class A services exacerbates the underrepresentation of SC/ST officers in senior roles.
- **Age Bias in Career Advancement:** SC/ST and PwBD candidates, who often join the civil service later, face challenges in advancing to senior positions due to reduced time before retirement.
- **Poor Implementation:** Despite the legal framework guaranteeing a 3% reservation for Persons with Disabilities (PwD) in civil services, poor implementation often results in qualified candidates being denied positions due to their disabilities.
    - **Example**:
        - Shweta Bansal, a 2012 civil services exam qualifier, was denied a post due to her locomotor disability, leading to a legal battle that eventually secured her place in the Indian Foreign Service.
        - Similarly, Ira Singhal faced similar discrimination in 2010, requiring legal intervention to secure her position in the Indian Revenue Service.
- **Fake Caste Certificates**: The misuse of fake caste certificates to claim reservation benefits undermines the integrity of affirmative action and perpetuates social inequalities, devaluing the efforts of genuine candidates from marginalised communities.
    - **Example**: In 2022, Pooja Khedkar was accused of using a fake caste certificate to secure a reserved quota position, highlighting the misuse of affirmative action

CHALLENGES DUE TO LACK OF MODERNISATION IN BUREAUCRACY

- **Inefficient Service Delivery:** The absence of modern technology and processes leads to slower and less efficient service delivery, hindering the government's ability to meet the needs of citizens promptly.
- **Resistance to Change:** Bureaucrats accustomed to traditional methods often resist adopting new technologies and innovations, resulting in outdated practices that fail to address contemporary challenges.
- **Understaffed Bureaucracy:** The lack of modernization in recruitment and workforce management processes results in an inefficient allocation of human resources, with a limited number of skilled staff available to manage critical positions. This creates a strain on governance.
- **Limited Transparency and Accountability:** The lack of digital tools and data-driven systems hampers transparency and accountability, making it difficult to track progress, monitor performance, and curb corruption.
- **Inadequate Skill Development:** Without modernization, there is limited emphasis on continuous skill development for civil servants, leading to a workforce that may lack the necessary expertise to handle complex, modern-day governance issues.

WAY FORWARD

Promoting Equity and Inclusion

- **Advocate for an Independent, Multi-Disciplinary Committee:** Form a committee with SC/ST, OBC, and PwBD representation to review and address civil services issues.
- **Revise Age Limits and Tenure:** Implement a fixed tenure of 35 years for civil servants, regardless of their age at entry, to ensure equitable opportunities for advancement. Adjust age limits if necessary to ensure retirement by around 67 years.
- **Implement Flexible Retirement Options:** Allow flexible retirement options with stringent annual medical fitness evaluations after a certain age to accommodate those who continue to perform effectively.
- **Ensure Equal Opportunities Across Categories:** Address systemic barriers that prevent late entrants, including SC/ST and PwBD candidates, from reaching senior positions by creating policies that provide equal opportunities for advancement regardless of age of entry.
- **Affirmative Action in Assignments**: Ensure SC/ST officers are given opportunities to lead significant assignments, including budget-making exercises, to reflect their involvement in crucial policy decisions.
- **Inclusion in Lateral Recruitment:** Ensure that lateral recruitment processes prioritise diversity, actively including candidates from underrepresented groups such as SC/ST, OBC, PwBD to create a more inclusive and representative administration.
- **Implement Targeted Financial Aid:** Governments should provide financial support to SC/ST candidates who clear initial stages of exams like UPSC, helping bridge gaps and empowering them to succeed in later stages
    - **Example**:
        - **Chief Minister Scheduled Tribe/Scheduled Caste Civil Service Promotion Scheme in Jharkhand** awards Rs 1 lakh to SC/ST students who clear the UPSC Preliminary Examination, aiding their preparation for the main exam and interview
        - **Telangana's "Rajiv Gandhi Civils Abhayahastam"** provides ₹1 lakh to SC, ST, OBC, Women, and EWS Civil Services aspirants who qualify for the Mains exams. Funded by Singareni Collieries, the program supports around 400 candidates annually.
- **Strengthen Verification Processes**: Implement stricter verification mechanisms for caste certificates to prevent fraudulent claims and ensure that reservation benefits reach the intended beneficiaries from marginalised communities.

Modernizing the Civil Services

- **Adopt a Consultative Approach**: Transition from traditional administrative roles to consultative and participatory roles, engaging with citizens and stakeholders to address diverse demands effectively.
- **Introduce Performance-Based Evaluations**: Regularly evaluate civil servants on their performance and competence, especially in higher positions, to ensure that promotions and key assignments are based on merit.
- **Build Domain Expertise**: Develop teams with specialised knowledge in urban planning, environment, water, waste management, and other critical areas to ensure informed decision-making and effective problem-solving.
- **Revise Training Programs:** Implement training that emphasises participative and collaborative skills for civil servants from the early stages.
- **Strengthen Public Participation Initiatives:** Establish long-term, non-partisan civic platforms and organisations to ensure sustained collaboration between citizens and government across political transitions.
    - **Example**: Bangalore Political Action Committee (B.PAC) has effectively collaborated with the government to address urban issues like healthcare and waste management.
- **Leverage Technology and Innovation:** Implementing comprehensive e-governance initiatives by utilising AI, big data analytics, and blockchain technology can enhance decision-making, reduce corruption, and make services more citizen-centric.

CONCLUSION

Modernising bureaucracy is essential for creating a government that is both efficient and inclusive. By embracing technology and diverse representation, we can ensure that public institutions better reflect the needs and aspirations of all citizens. A forward-looking bureaucracy not only enhances governance but also fosters trust and transparency in the democratic process.

SAMPLE QUESTION

Q) Examine the role of affirmative action in enhancing representation in the bureaucracy. How can these policies be integrated into modern reforms to better include underrepresented groups, including SC/ST, OBC and PwD communities? **(10 marks)(150 words)**

WOMEN SECURITY AND EMPOWERMENT ISSUES

Syllabus: GS II - Welfare schemes for vulnerable sections of the population

PYQ MAPPING

Q) *Discuss the contribution of civil society groups for women's effective and meaningful participation and representation in state legislatures in India.* ***(2023)***

Q) *Can the vicious cycle of gender inequality, poverty and malnutrition be broken through microfinancing of women SHGs? Explain with examples.****(2021)***

Q) *"Empowering women is the key to control population growth". Discuss.* ***(2019)***

SHORT TAKES

- **Gender gap report:** First published in 2006 by World Economic Forum, it is an index that measures a country's progress towards gender parity that tracks progress in four key areas: economic participation and opportunity, educational attainment, health and survival, and political empowerment.
- **National Family Health Survey(NFHS):** The Ministry of Health and Family Welfare (MoHFW) conducts the survey every three years, having completed five rounds so far and it delivers reliable data on population dynamics, health indicators, and emerging issues to aid policymakers and evaluate government programs
- **Glass ceiling effect:** A social phenomenon where certain invisible barriers prevent women from being promoted to leadership and executive positions, even when they have the right qualifications and skills
- **Persistent Vegetative State:** A chronic disorder in which an individual with severe brain damage appears to be awake but shows no evidence of awareness of their surroundings.

INTRODUCTION

Women's security and empowerment are two interconnected concepts vital for a just and equitable society. Security provides the foundation for women to live free from fear and violence, while empowerment equips them with the tools and opportunities to shape their own destinies.By understanding the complexities of women's security and empowerment, a world where women are safe, respected, and empowered to reach their full potential can be created.

WHY IN NEWS

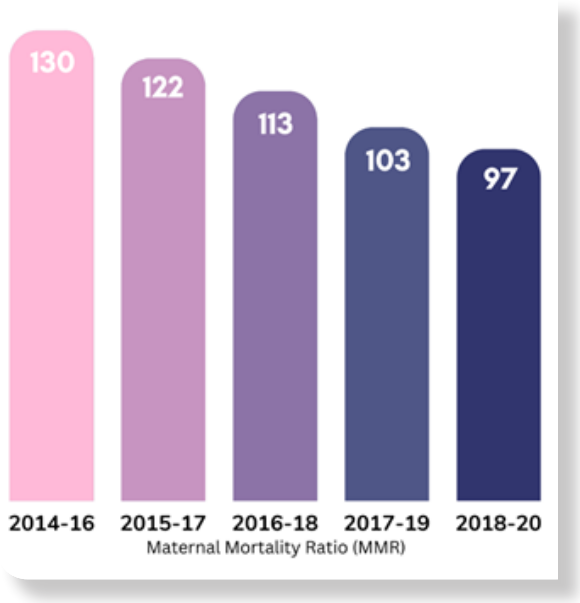
The recent brutal rape and murder of a 31-year-old trainee doctor at R G Kar Medical College in Kolkata has shocked the nation, raising serious concerns over the safety of women in public institutions. The incident has sparked widespread outrage, with the police facing criticism for mishandling the case. In response, the Kolkata High Court has transferred the investigation to the Central Bureau of Investigation (CBI).

CURRENT STATUS OF INDIAN WOMEN

Social Sphere

- **Overall Gender Gap:**The 2024 Global Gender Gap Index from the World Economic Forum (WEF) ranked India 129th out of 146 countries, which is two places lower than its 2023 ranking of 127th.
- **Sex Ratio:** Based on the National Family Health Survey (NFHS-5, 2019-21), the Overall Sex Ratio in India is **1020 females per 1000 males**. But, the Sex Ratio at Birth remains low at 929, which shows continued less preference for females.
- **Maternal Mortality Rate (MMR)**: The Registrar General's report revealed that India's maternal mortality rate (MMR) had **decreased to 97 per 100000 live births** during the 2018-2020 period.
- **Malnutrition**: Based on the NFHS-5, **18.7% of women aged 15-49 years are underweight** and nearly **53% of women aged 15-49 years are anaemic.**
- **Literacy Rate:** As per the NFHS-5 (2019-21), the literacy rate in **females is 70.3%** compared to about **84.7% for men.**
- **Gender-Based Violence:** The National Crime Records Bureau data disclosed a staggering **4,45,256 cases**

of crime against women in 2022, translating to approximately 51 FIRs every hour. This marked a notable increase from 2021, which recorded 4,28,278 cases, and 2020, which reported 3,71,503 cases



Political Sphere

Despite significant strides in women's empowerment, India continues to face a gender gap in political representation.

- **Elected MPs:** According to the Election Commission of India, as of December 2023, **15% of Lok Sabha MPs and 13% of Rajya Sabha MPs are women.**
- **Panchayati Raj institutions:** In the 32 States and Union Territories (UTs), **out of 3,187,320 representatives, 14,53,973 were women**, per the Report on Finances of Panchayati Raj Institutions.
  - While local panchayats have achieved greater female representation, reaching 46.94% in April 2023, the prevalence of the 'Sarpanch-Pati' culture undermines this progress.
- **Political Parties:** As of 2024**, India ranks 143 in the list of countries in the 'Monthly ranking of women in national parliaments'** published by the Inter-Parliamentary Union, a global organisation for national parliaments.
  - The Trinamool Congress has the highest proportion of women MPs in the current Lok Sabha at 38%.
  - The ruling Bharatiya Janata Party and principal Opposition Congress party have around 13% each
  - Naam Tamilar Katchi, a State party in Tamil Nadu, has been following a voluntary quota of 50% for women candidates in the last three general elections.

Economic Sphere

- **Participation in the labour force Survey (PLFS)**: The PLFS data on employment from 2017–18 to 2022–23 indicates an optimistic picture of women's participation.
  - There has been an **increase in Worker Population Ratio (WPR)** for women aged 15 years or more, from 22 percent in 2017–18 to 35.9 percent in 2022–23.
  - **WPR** is defined as the percentage of employed persons in the population.
- **Quality of employment:**. While women's employment in India has increased, the rise in the Worker Population Ratio (WPR) is mainly due to a **surge in self-employment,** from **51.87 percent in 2017–18 to 65.3 percent in 2022–23.**
- **Wage disparity**: According to Gender Gap Index 2024, India's economic parity stood at 39.8 per cent. This means that women in India on an average earn **Rs 39.8 for every Rs 100 that men earn.**
- **Safety of employment:** Safety concerns are prevalent among Indian women, with **46% expressing worry about their safety at work or during commutes**, according to the Women @ Work 2024 Report by Deloitte.
  - The report also reveals that 14% of women have experienced harassment or discomfort from clients or customers.

Security Issues

Some infamous incidents where the security of women have been proved significantly being violated include

- **The Aruna Shanbaug Case, 1973:** The case involved Aruna Shanbaug, a nurse who was left in a **Persistent Vegetative State (PVS)** after being sexually assaulted by a hospital janitor in 1973.
  - The case addressed the issue of prolonged patient suffering and the choice to withhold medical care from patients who are unable to make informed decisions.
- **The Soumya Rape Case, 2011:** A criminal case that involves the rape and murder of Soumya, a 23-year-old woman from Kerala, in 2011, On her return trip from home on a passenger train from Ernakulam to Shoranur.
- **The Nirbhaya case, 2012:** Also known as the 2012 Delhi gang rape and murder, is about the brutal assault of a 23-year-old physiotherapy intern, on December 16, 2012.

- **The Unnao Case, 2017:** In 2017, a 16-year-old girl was raped by an MLA and his accomplices in Unnao, Uttar Pradesh after promising of a job. She was allegedly kidnapped and raped for over a week and the survivor's family was brutally tortured.
- **Hathras Gang Rape Case, 2020**: On 14 September 2020, a 19-year-old Dalit girl was gang-raped in Hathras, Uttar Pradesh, by four upper-caste men. She later died in a Delhi hospital. The case sparked nationwide outrage, particularly after the police were accused of cremating her body without the family's consent, allegedly to hide evidence.
- **Kolkata Rape case, 2024:** A 31-year-old trainee doctor at R G Kar Medical College in Kolkata was brutally raped to death on August 2024.

CONSTITUTIONAL PROVISIONS

- **Article 14** guarantees equality before the law or the equal protection of the laws to all citizens, including women.
- **Article 15(1)** prohibits discrimination on grounds only of sex.
- **Article 15(3)** permits the state to make affirmative discrimination in favour of women in order to mitigate their cumulative socio-economic and political disadvantages.
- **Article 16** provides for equality of opportunity for all citizens, including women, in matters of employment or appointment to any office under the State. It also prohibits discrimination or being made ineligible for any employment or office under the State on grounds of only sex.
- **Article 39** directs the State to secure equal pay for equal work for men and women.
- **Article 42** directs the State to make provision for just and humane conditions of work and maternity relief.
- **Article 51A** casts a Fundamental Duty on every citizen to renounce practices derogatory to the dignity of women.
- **Article 243(D)(3)**: not less than one-third (including the number of seats reserved for women belonging to the scheduled castes and the scheduled tribes) of the total number of seats to be filled by direct election in every Panchayat to be reserved for women and such seats to be allotted by rotation to different constituencies in a panchayat.

GOVERNMENT POLICIES

- **The Dowry Prohibition Act of 1961:** The act prohibits dowry and defines it as property, goods, or money given by either party to a marriage, or by anyone connected with the marriage, such as the parents of either party.
- **Equal remuneration act, 1976:** The act's objectives include providing equal pay for men and women based on the nature of their work,ensuring equality of opportunity in employment,protecting people from employment discrimination ,preventing unfair dismissal based on sex etc.
- **The protection of women from domestic violence act, 2005**: An Act to provide for more effective protection to women who are victims of violence of any kind occurring within the family and for matters connected therewith or incidental thereto.
- **The prohibition of child marriage act, 2006 :** The Prohibition of Child Marriage Act of 2006 was enacted by the Government of India to eradicate child marriage in India.
  - The act's main objective is to prohibit marriages where either the bride or groom is below the marriageable age of 18 for girls and 21 for boys.
  - The act also aims to protect and provide relief to victims, and to increase punishment for those who promote, abet, or solemnise child marriages.
- **Protection of Women from Sexual Harassment (POSH) Act of 2013:**The act aims to create a safe and secure work environment by requiring employers to provide a safe and secure work environment and setting up an Internal Complaints Committee (ICC) to address complaints.
- **Nari Shakti Vandan Adhiniyan (Women's Reservation Act) 2023 [128th Constitutional Amendment Act]**: Added three new articles providing for women reservation in Lok Sabha and Legislative Assemblies
  - Article 239AA provides for reservation of 1/3rd of seats for women in Delhi Legislative Assembly
  - Article 330A provides for reservation of 1/3rd of seats for women in Lok Sabha
  - Article 332A provides for reservation of 1/3rd of seats for women in State Legislative Assemblies.

GOVERNMENT SCHEMES

- **Mahila Samman Savings Certificate:** Designed for women's financial independence, the scheme allows women to deposit a minimum of Rs 1000 or a maximum of up to Rs 2 lakh for two years and is given an interest rate of 7.5 percent.
- **Beti Bachao Beti Padhao**: The aim of this scheme is to reduce the decline in the girl sex ratio and empower women. It is implemented by the Ministry of Women and Child Development, Ministry of Health Family Welfare and Ministry of Human Resources.
- **One Stop Centre and Universalization of Women Helplines**:
  - **One Stop Centres (Sakhi Centres)**: These centres provide integrated services for women affected by violence, including police assistance, medical aid, legal counselling, psycho-social support, and temporary shelter.
  - **Women Helpline (WHL) Scheme**: This scheme offers 24/7 emergency and non-emergency response to women facing violence in both public and private spaces.
- **Ujjawala Scheme**: The Ujjawala Scheme is being implemented as a Centrally Sponsored Scheme for Prevention of trafficking and for Rescue, Rehabilitation, Reintegration and Repatriation of victims of trafficking for commercial sexual exploitation.

LANDMARK JUDGEMENT

- **Ahmad Khan v. Shah Bano Begum,1985:** A controversial maintenance lawsuit in India, in which the Supreme Court delivered a judgement favouring maintenance given to an aggrieved divorced Muslim woman.
- **Vishakha vs State of Rajasthan, 1997:** The case identified sexual harassment at the workplace as a form of discrimination against women and a violation of their fundamental rights. It gave guidelines to address sexual harassment and provided women with a tool to fight against it.
- **Laxmi v. Union of India, 2014**: The Supreme Court issued directives for the regulation of acid sales and provided compensation for acid attack survivors. This case played a crucial role in improving legal and medical support for survivors.
- **Shayara Bano v. Union of India, 2017:** This case resulted in the Supreme Court declaring the practice of instant triple talaq (talaq-e-biddat) unconstitutional, a significant step towards ensuring the rights and dignity of Muslim women

POSITIVE IMPACTS

- **Increased Representation in Politics:** The introduction of **reserved seats for women in local governance (Panchayati Raj)** has significantly increased female participation in politics, empowering women to influence decision-making and governance at the grassroots level.
- **Legal Reforms for Women's Rights**: Landmark legal reforms such as the **Protection of Women from Domestic Violence Act (2005)** have strengthened legal protection for women against violence, harassment, and discrimination.
- **Economic Empowerment Initiatives**: Government programs like the **Pradhan Mantri MUDRA Yojana and Self Help Groups (SHGs)** have provided women with access to credit and entrepreneurship opportunities, leading to increased financial independence.
- **Educational Advancements:** There has been a substantial increase in female literacy rates and educational attainment, supported by initiatives like **Beti Bachao Beti Padhao,** which promote the education and empowerment of the girl child.
- **Enhanced Workplace Safety**: The implementation of the **Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013**, has led to more robust mechanisms to ensure a safe and inclusive work environment, encouraging more women to participate in the workforce.

CHALLENGES

- **Social attitudes:** Deep-rooted patriarchal values and societal norms continue to restrict women's rights and freedoms, enforcing gender roles that limit their participation in various aspects of life.
  - **Example**:
    - As per the NFHS-5**, 23.3% of women** aged 20-24 years were married before age 18.
    - According to 2023 UNICEF report titled 'Is an End to Child Marriage within Reach?, India accounts for one-third of the world's child brides.
- **Gender-Based Violence:** Women in India continue to face significant levels of violence, including domestic violence, sexual harassment, and honor crimes, which undermine their safety and freedom.
  - **Example:** The NCRB report shows a disturbing rise in crimes against women in India in 2022, with nearly 51 FIRs registered every hour.
- **Reproductive Health Issues:** Access to reproductive healthcare services is often limited, particularly in rural areas, leading to challenges such as maternal mortality, unsafe abortions, and inadequate family planning resources.
- **Workplace Discrimination**: Women often face discrimination in the workplace, including unequal pay, limited career advancement opportunities, and harassment, which hinder their professional growth
- **Glass ceiling effect:** The glass ceiling is still quite intact, and women in India's largest and most successful companies are not able to break it.
  - **Example**: Data sourced from Prime Database shows that just five per cent of India's 500 listed companies have a woman as a Chief Executive Officer or a Managing Director. Of these 500 companies, 319 don't have women as Key Managerial Personnel

WAY FORWARD

- **Strengthen Legal Protections:** Enforce existing laws more effectively to combat gender-based violence and discrimination, ensuring swift justice and stronger deterrents.
- **Promote Female Education**: Increase access to education and vocational training for women, especially in rural areas, to enhance their employability and economic independence.
- **Support Economic Empowerment**: Provide incentives for companies to hire women, enforce equal pay, and encourage female entrepreneurship to close the gender pay gap.
- **Enhance Healthcare Access**: Improve access to reproductive and maternal health services, particularly in underserved regions, to ensure better health outcomes for women.
- **Shift Social Norms**: Launch awareness campaigns to challenge patriarchal attitudes and promote gender equality, engaging communities in the process of cultural change.

CONCLUSION

While India has made significant strides in women's empowerment, the pace of progress varies across regions and communities. Though there have been notable achievements in education, employment, and political representation, deep-rooted societal and cultural barriers continue to hinder women's full participation in all aspects of life. To accelerate the pace of women's empowerment and create a more egalitarian society, a multi faceted approach needed to be taken.

SAMPLE QUESTION

Q) In a rapidly modernising India, how do persistent security threats and gender inequalities undermine women's empowerment and what transformative social, economic and political strategies can effectively bridge this gap? **(10 marks)(150 words)**

SCIENCE & TECH ROUND UP

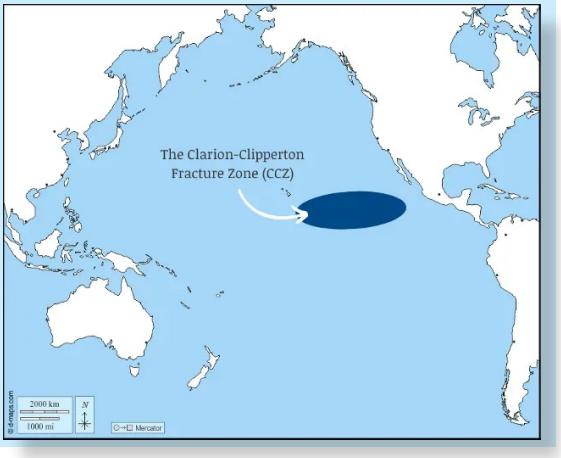
DARK OXYGEN

WHY IN NEWS

Recently, Scientists reported in ***Nature Geoscience*** that an unknown process is generating oxygen in the deep oceans, where photosynthesis is not possible due to the lack of light.

SHORT TAKES

- **Polymetallic nodules:**
  - They are lumps found on the ocean floor composed of iron, manganese hydroxides, and rock. They contain valuable metals like manganese, copper, and nickel.
- **Clarion-Clippertone Zone**
  - It is a vast plain in the North Pacific Ocean between Hawaii and Mexico.It is known to hold large volumes of polymetallic nodules containing minerals used in electric vehicles and solar panels including manganese, nickel, copper, and cobalt.



What is Dark Oxygen?

- Recent study published in Nature Geoscience reveals that oxygen is released from mineral deposits located 4,000 metres (13,000 feet) below the surface in the Pacific Ocean's **Clarion-Clipperton Zone (CCZ).**
- The study reveals a source of oxygen apart from the widely recognized process of photosynthesis.
- **Source:**
  - One hypothesis is that polymetallic nodules on the ocean floor transport electric charges that split water molecules, releasing oxygen.
  - These nodules, made of iron, manganese hydroxides, and rock, may act like cells of a battery when they are close together.
  - However, the exact energy source for the nodules' ability to produce oxygen remains unclear.

RESEARCH

- The journey to this discovery began over a decade ago during a 2013 research mission.
- The initial goal of research was to comprehend how the CCZ seafloor's oxygen levels change with depth.
  - The 4.5 million square kilometre (1.7 million square mile) **Central Cordillera (CCZ)** is home to iron and manganese-rich polymetallic nodules, which resemble coal.
  - It has been discovered that these nodules may manufacture oxygen on their own without the need of sunshine or photosynthesis.
- They tracked oxygen levels using landers, which are mechanical platforms made to descend freely to the seafloor, and found this surprising source of dark oxygen.

SIGNIFICANCE

- **Challenging the Traditional Understanding**:
  - This finding suggests that Earth's oxygen supply might not rely solely on photosynthesis.
  - The oxygen generated by these nodules in dark, sunless environments indicates an alternative, previously unknown mechanism of oxygen production.

- **Origins of Life**:
  - As per Sweetman's comments, this discovery may provide clues about the origins of life on Earth. If oxygen production can occur without sunlight, life could have existed before the evolution of photosynthesis.
  - This challenges the notion that life must have started in environments exposed to sunlight.
- **Extraterrestrial Life**: The discovery opens up the possibility that similar oxygen-producing mechanisms could occur on other planets or moons, potentially supporting life in environments previously considered inhospitable due to the absence of sunlight.

CONCLUSION

In summary, the identification of dark oxygen production mechanisms highlights a previously overlooked source of oxygen that could have significant implications for our understanding of life's origins on Earth and the potential for life elsewhere in the universe.

SAMPLE QUESTION

Q) *Discuss potential implications of discovering dark oxygen for our understanding of Earth's atmospheric processes and the origins of life?* **(10 marks)(150 words)**

DDOS ATTACK

WHY IN NEWS

Elon Musk hosted former President Donald Trump for a live audio interview on his social media platform X on August 12, but their conversation was delayed by 40 minutes and plagued by glitches due to a reported "massive DDoS attack on X.

What is a DDoS Attack?

- To understand what a distributed denial of service (DDoS) is, we first need to know what a **'Denial of Service' (DoS) means.**
  - A denial of service is a deliberate cyber-attack that floods a computer system with so much data that it is slowed down, and in many cases, is forced offline.
  - A typical DoS attack usually stems from one computer causing havoc to another network of computers.
- On the other hand, with a **DDoS**, the source of the cyber-attack is '**distributed**' amongst hundreds and sometimes thousands of different computer sources.
- By using multiple computers, the perpetrators make it difficult to combat and find the source of the attack, causing widespread disruption to the system or website.

HOW DOES A DDOS ATTACK WORK?

- DDoS attacks are carried out with networks of Internet-connected machines.
- These networks consist of computers and other devices (such as IoT devices) which have been infected with malware, allowing them to be controlled remotely by an attacker.
  - These individual devices are referred to as bots(or zombies), and a group of bots is called a **botnet**.
- Once a botnet has been established, the attacker is able to direct an attack by sending remote instructions to each bot.
- When a victim's server or network is targeted by the botnet, each bot sends requests to the target's IP address, potentially causing the server or network to become overwhelmed, resulting in a denial-of-service to normal traffic.
- Because each bot is a legitimate Internet device, separating the attack traffic from normal traffic can be difficult.

IMPLICATIONS

Service Disruption:

- DDoS attacks overwhelm a target's servers or network with excessive traffic, causing slowdowns or complete outages.

Financial Losses:

- Businesses may suffer direct financial losses due to downtime, lost sales, and disrupted operations.

Damage to Reputation:

- Frequent or successful DDoS attacks can harm a company's or organisation's reputation, leading to a loss of customer trust and credibility.

Legal and Regulatory Issues:

- Companies affected by DDoS attacks might face legal and regulatory challenges, especially if the attack leads to breaches of personal data or failure to meet compliance standards.

Potential for Escalation:

- A DDoS attack can sometimes serve as a distraction or precursor to more sophisticated cyberattacks, such as data breaches or ransomware attacks.

Impact on Public Services

- : When DDoS attacks target public services or critical infrastructure (e.g., healthcare, utilities, government services), they can disrupt essential functions, posing risks to public safety and welfare.

Broader Economic Impact:

- Widespread DDoS attacks can have a ripple effect, impacting multiple industries, supply chains, and even national economies, especially if critical infrastructure is targeted.

WAY FORWARD

Traffic Differentiation:

- If an organisation believes it has just been victimised by a DDoS, one of the first things to do is determine the quality or source of the abnormal traffic.
- Of course, an organisation cannot shut off traffic altogether, as this would be throwing out the good with the bad.
- As a mitigation strategy, use an Anycast network to scatter the attack traffic across a network of distributed servers.
  - Anycast is a network addressing and routing method in which incoming requests can be routed to a variety of different locations.
- This is performed so that the traffic is absorbed by the network and becomes more manageable.

Black Hole Routing:

- Another form of defence is black hole routing, in which a network administrator—or an organisation's internet service provider—creates a black hole route and pushes traffic into that black hole.
- With this strategy, all traffic, both good and bad, is routed to a null route and essentially dropped from the network.
- This can be rather extreme, as legitimate traffic is also stopped and can lead to business loss.

Rate Limiting:

- Another way to mitigate DDoS attacks is to limit the number of requests a server can accept within a specific time frame.
- This alone is generally not sufficient to fight a more sophisticated attack but might serve as a component of a multipronged approach.

Firewalls:

- To lessen the impact, some organisations opt for a Web Application Firewall (WAF).
- A WAF is an appliance that sits between the internet and a company's servers and acts as a reverse proxy.
- As with all firewalls, an organisation can create a set of rules that filter requests.
- They can start with one set of rules and then modify them based on what they observe as patterns of suspicious activity carried out by the DDoS.

CONCLUSION

DDoS attacks are a serious threat that disrupts online services and impacts businesses and public institutions. To mitigate these risks, organisations should implement strong security measures, enhance infrastructure, collaborate with partners, and maintain proactive monitoring.

SAMPLE QUESTION

Q) *Discuss the impact of DDoS attacks, and how do recent research findings address the problems associated with such attacks?* **(10 marks)(150 words)**

SMALL SATELLITE LAUNCH VEHICLE (SSLV)

WHY IN NEWS

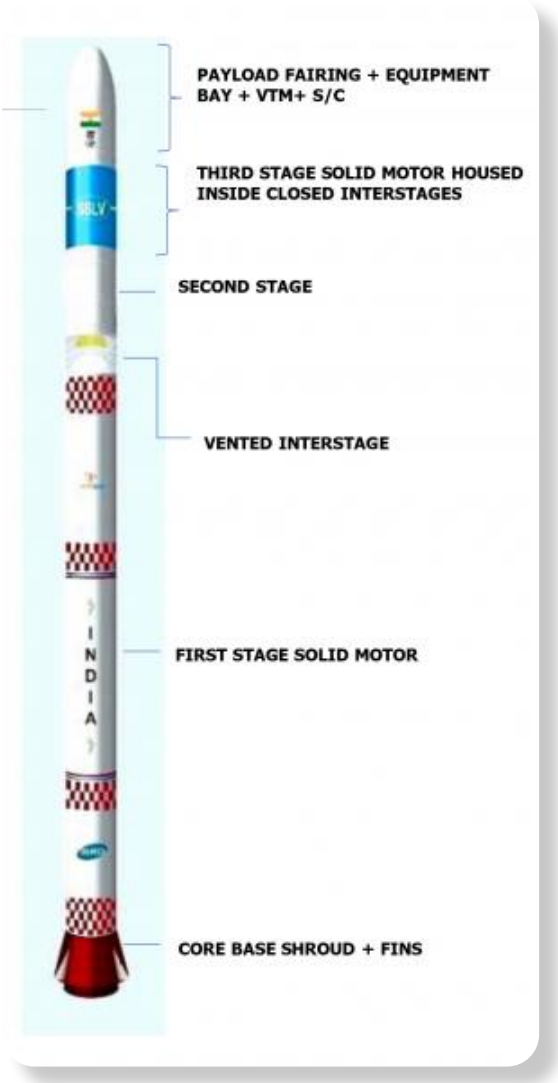
The Indian Space Research Organisation (ISRO) successfully launched the third developmental flight of the Small Satellite Launch Vehicle (SSLV) from the Satish Dhawan Space Centre in Sriharikota on August 16. The SSLV-D3 placed the Earth observation satellite EOS-08 precisely into orbit.

What is an SSLV?

- Small Satellite Launch Vehicle (SSLV) is a **three stage Launch Vehicle** configured with three Solid Propulsion Stages and a liquid propulsion-based **Velocity Trimming Module (VTM)** as a terminal stage.
  - SSLV is **2m in diameter** and **34m in length** with a lift-off weight of around 120 tonnes.
  - SSLV is capable of launching **500kg** satellites in 500km planar orbit from Satish Dhawan Space Centre (SDSC).

FEATURES

- BLow cost
- Low turn-around time
- Flexibility in accommodating multiple satellites
- Launch demand feasibility
- Minimal launch infrastructure requirements



EOS-08 (EARTH OBSERVATION SATELLITE)

- **Design Platform**:
  - Built on ISRO's Microsat/IMS-1 bus, known for its compact and efficient design.
- **Orbit**:
  - Operates in a Circular Low Earth Orbit (LEO) at an altitude of 475 km with an inclination of 37.4°.
- **Mission Life: 1 year**
- **Payloads**
  - **Electro Optical Infrared Payload (EOIR):** Captures images in MIR and LWIR bands for surveillance, disaster monitoring, and environmental assessments.
  - **Global Navigation Satellite System-Reflectometry (GNSS-R) Payload:** Monitors ocean surface winds, soil moisture, and inland water bodies using GNSS-R-based remote sensing.

- **SiC UV Dosimeter:** Monitors UV irradiance, particularly for ISRO's Gaganyaan Mission, ensuring safety against UV radiation.

Technological Innovations

- **Integrated Avionics System:** Combines Communication, Baseband, Storage, and Positioning (CBSP) functions into one system.
- **Embedded Technologies:** Includes a Structural Panel Embedded with **PCB** (Printed Circuit Board), Embedded Battery, enhancing structural efficiency and power reliability.
- **Advanced Antennas**: Micro-DGA (Dual Gimbal Antenna) and M-PAA (Phased Array Antenna) for precise control and enhanced signal transmission.
- **Flexible Solar Panels & Nano Star Sensor:** Improves energy efficiency and satellite orientation in space.

SIGNIFICANCE OF THE PROJECT

- **Cost-Effective Launch Solution**: low-cost launch vehicles with short turnaround times and minimal infrastructural requirements.
  - The SSLV can launch satellites weighing up to 500 kg and accommodate multiple satellites.
- **Increased Accessibility**: It caters specifically to the growing market of small satellite operators, including startups, universities, and research institutions, enabling quicker and more frequent access to space.
- **Rapid Deployment**:
  - SSLV is designed for quick assembly and launch, significantly reducing the turnaround time compared to larger launch vehicles, which is beneficial for time-sensitive missions.
  - The SSLV is the smallest vehicle at 110-ton mass at ISRO.
  - It will take only 72 hours to integrate, unlike the 70 days taken now for a launch vehicle.
  - Only six people will be required to do the job, instead of 60 people.
  - The entire job will be done in a very short time and the cost will be only around Rs 30 crore. It will be an on-demand vehicle.
- **Versatility**: The vehicle can carry multiple small payloads, providing flexibility for various mission requirements, including Earth observation, communication, and scientific research.
- **Enhancing India's Space Capabilities**: SSLV strengthens India's position in the global small satellite launch market, promoting self-reliance and boosting ISRO's ability to offer launch services to international customers.
- **Boost to Commercial Space Sector**: By offering a dedicated small satellite launch vehicle, SSLV-D3 supports the growth of India's private space sector, encouraging innovation and investment in space technology.

CONCLUSION

The SSLV-D3 project significantly enhances India's space capabilities by providing a cost-effective, flexible, and rapid launch solution for small satellites. It supports the growing demand for small satellite missions, boosts India's position in the global space market, and fosters the development of the commercial space sector.

SAMPLE QUESTION

Q) How does the SSLV-D3 project enhance India's space capabilities, and what impact does it have on the global space market and the development of the commercial space sector? **(10 marks)(150 words)**

AGNIBAAN SOrTeD

WHY IN NEWS

Recently, the private space company Agnikul Cosmos achieved a milestone with the successful launch of its indigenously-built rocket, marking a new era for India's space industry.

Rocket Agnibaan SOrTeD (Sub Orbital Technological Demonstrator

- India's 1st semi-cryogenic engine-powered rocket launch flight that was designed and manufactured indigenously through 3-D Printing.
- This test flight aims to demonstrate in-house and home-grown technologies, gather crucial flight data and ensure optimal functioning of systems for Agnikul's orbital launch vehicle, the 'Agnibaan'.

AGNIBAAN ROCKET

- It is India's first ever vehicle equipped with a **semi cryogenic engine,** the **Agnilet**, a subcooled liquid oxygen-based propulsion system developed indigenously.
- The rocket engine will burn kerosene in liquid oxygen and can be directly used in the rocket.
- It stands 18 metres tall and is 1.3 metres in diameter.
- It has the capability to carry a 100-kg payload up to a height of 700 km with a lift of mass of 14,000 Kgs.
- It can access both low- and high-inclination orbits and is completely mobile.
- It will also have the **first ever Ethernet-based avionics** architecture and fully in-house developed autopilot software from India.
- The rocket is also designed for launch from more than 10 different launch ports.
- To ensure its compatibility with multiple launch ports, AgniKul has built a launch pedestal named 'Dhanush' that will support the rocket's mobility across all its configurations.

AGNIKUL COSMOS

- It is an IIT Madras incubated space startup based in **Chennai**.
- It was established in 2017.
- It became the first company in the country to sign an agreement with ISRO under the **IN-SPACe** initiative to have access to the space agency's expertise and its facilities to build Agnibaan in December 2020.
- In 2022, Agnikul inaugurated India's first private launchpad and mission control centre at Satish Dhawan Space Centre.

SIGNIFICANCE OF THE MISSION

- **Boost to India's Private Space Sector**: It demonstrates the growing capabilities of private companies in India's space industry, paving the way for increased private sector involvement and innovation.
- **Indigenous Technological Advancement**: The mission showcases India's ability to develop and launch rockets using homegrown technology, reinforcing self-reliance in space technology.
- **Economic Opportunities**: Success in private space missions can attract investments, create jobs, and foster partnerships, boosting India's economy and its position in the global space market.
- **Encouragement for Startups**: The achievement by Agnikul Cosmos can inspire other startups and entrepreneurs to enter the space sector, contributing to a more vibrant and competitive space ecosystem.
- **Supporting Small Satellite Launch Demand**: The mission aligns with the growing demand for small satellite launches, providing cost-effective and flexible launch solutions for domestic and international clients.
- **Collaboration with ISRO**: The success of private missions like this one strengthens collaboration between the Indian Space Research Organisation (ISRO) and private companies, enhancing India's overall space capabilities.

CONCLUSION

In conclusion, Agnikul Cosmos's successful launch is a milestone for India's space sector, showcasing the potential of private companies, boosting indigenous technological capabilities, and opening new economic opportunities, positioning India as a significant player in the global space industry.

SAMPLE QUESTION

Q) How does Agnikul Cosmos's successful launch serve as a milestone for India's space sector, and what impact does it have on private companies, indigenous technology, and India's position in the global space industry? **(10 marks)(150 words)**

QUANTUM DOTS

WHY IN NEWS

The 2023 Nobel Prize in Chemistry was recently awarded to Moungi G. Bawendi, Louis E. Brus, and Alexei I. Ekimov recently for the discovery and synthesis of quantum dots.

What are Quantum Dots?

The properties of an element are typically determined by the number of electrons it has. However, when matter is reduced to nano-sized dimensions, its properties are influenced by its size. As a particle becomes smaller, its electrons are more confined, which alters its characteristics. These size-dependent particles are known as quantum dots.?

PROPERTIES

Properties of Quantum Dots:

- Quantum Confinement Effects: Quantum dots demonstrate quantum confinement effects, where electrons and holes are confined within a limited volume. This leads to discrete energy levels, contributing to their size-dependent optical and electronic properties.

Semiconducting Properties:

- Quantum dots exhibit semiconducting behaviour due to their small size.
- For example, This is essential for many electronic and optoelectronic applications.

Long Photoluminescence Lifetimes:

- Quantum dots exhibit long photoluminescence lifetimes, meaning they continue to emit light for

extended periods.

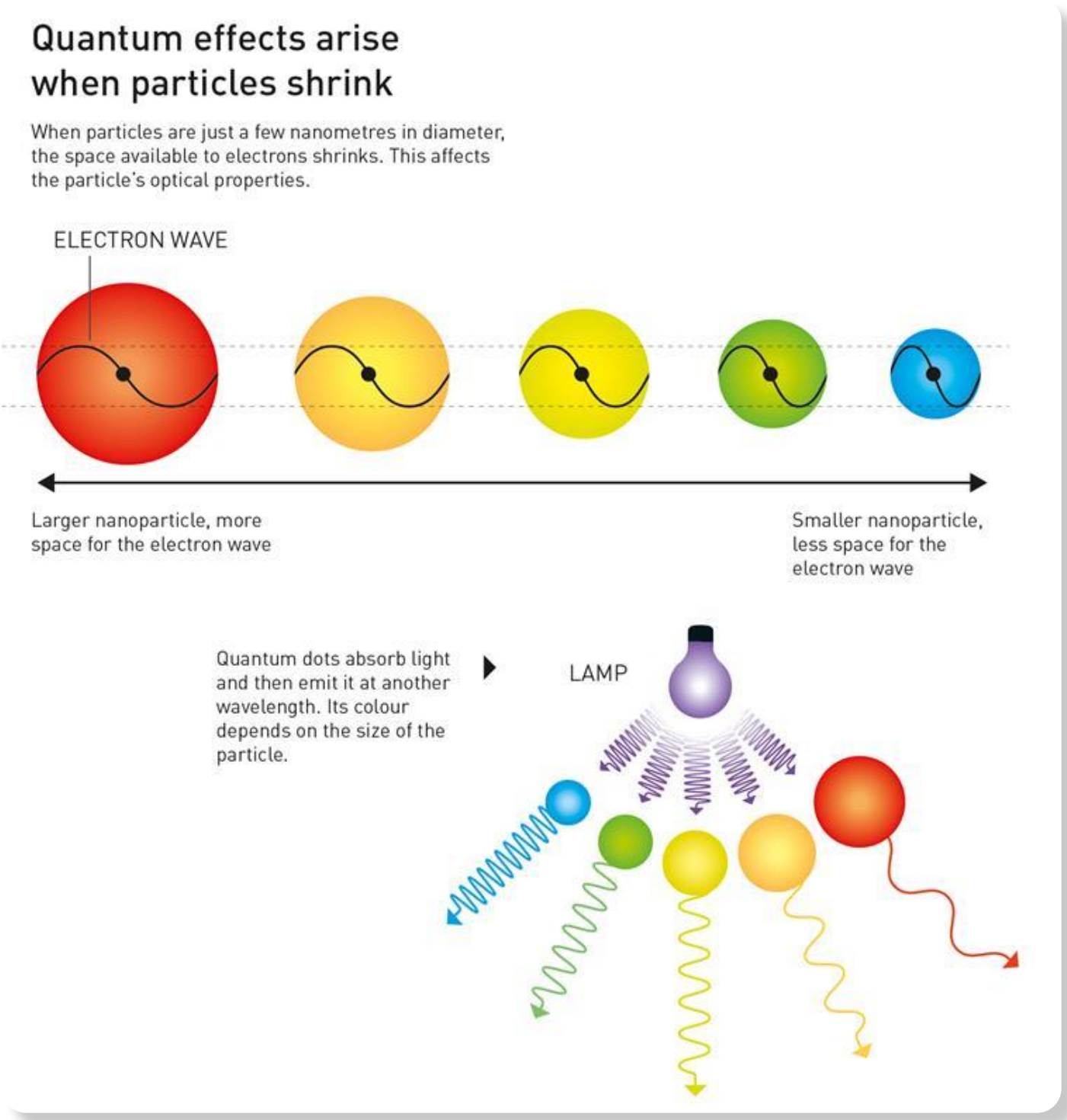
- For example, This is advantageous for biological imaging and tracking, where prolonged fluorescence is desirable.

Broad Absorption Spectrum:

- Quantum dots have a broad absorption spectrum, which means they can absorb a wide range of incoming light, including ultraviolet (UV) and visible light.
- For example, This is beneficial for applications in photovoltaics, where they can capture a broad range of sunlight wavelengths.

Narrow Emission Spectrum:

- Quantum dots emit light at very specific and narrow wavelengths. This characteristic leads to the production of vibrant and well-defined colours.
- For example, It is particularly advantageous for improving colour accuracy in displays, such as QLED (Quantum Dot Light Emitting Diode) screens.



APPLICATIONS

QLED TV

- Older TVs made of LCD can emit lights of colours only in a certain band. Only 1/3rd of what humans can sense.
- QLEDs have changed this as they are capable of emitting all colours depending on their size. Thus QLED TVs provide high-definition, brighter and more colourful displays.

Cancer treatment to become more targeted

- Quantum dots exhibit specific opto-electronic properties. They can be used for fluorescence imaging where quantum dots are injected in the body which when encounters a cancer cell attaches to it. When you shine a light of a certain frequency it lights up and doctors can exactly target these cells.
- Quantum dots can also be designed to release drugs in response to a certain trigger like pH or temperature.

Solar cells:

- With its opto-electronic property, Q-dots are used in solar cells with higher efficiency.

Bio-sensors:

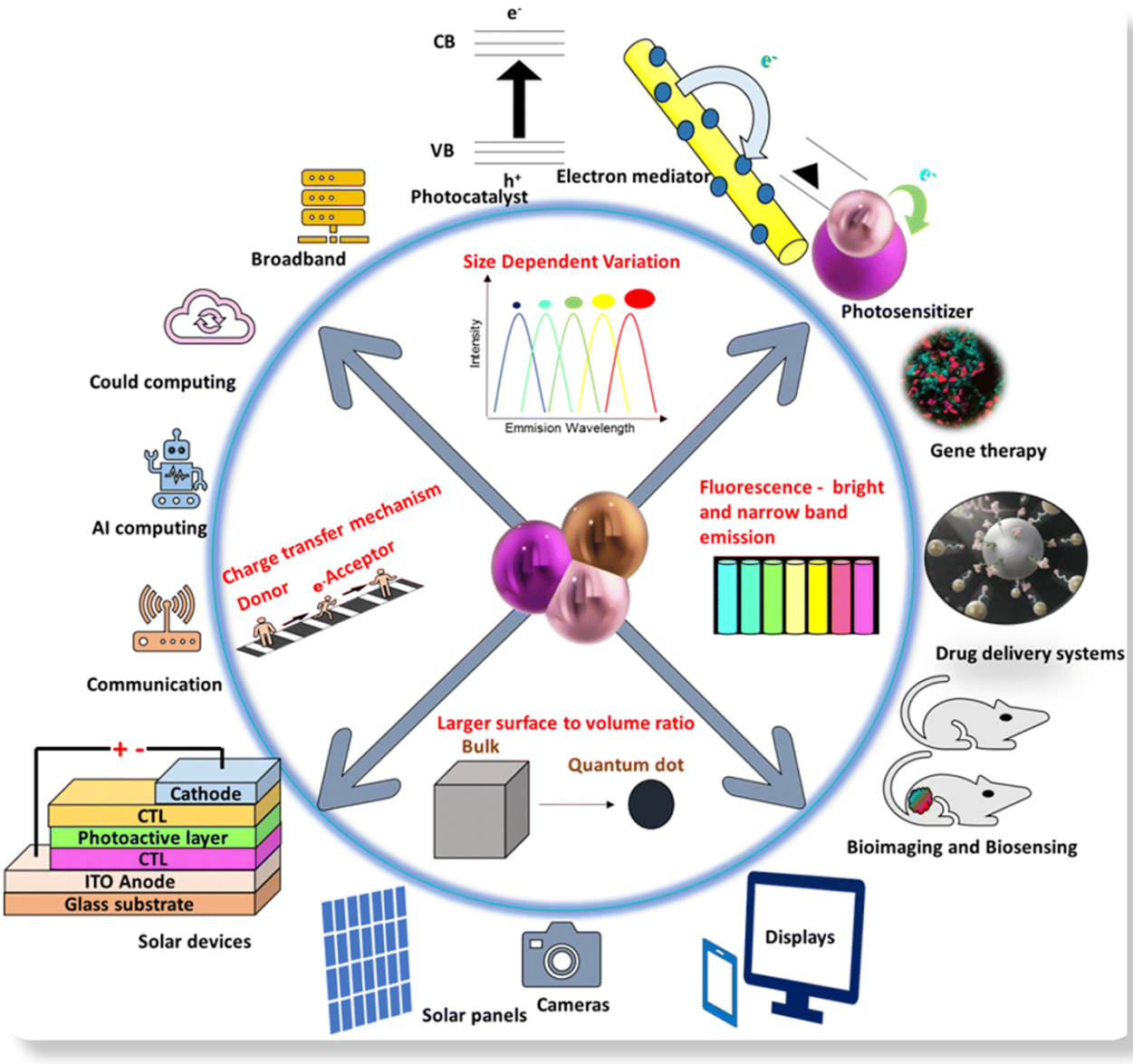
- Q-dot sensors can detect the presence of pathogens in food or water, or monitor the levels of pollutants in the environment.

Biomedical imaging:

- Q-dot can revolutionise fluorescence imaging, MRI, and CT scans with its high sensitivity.

Photonics:

- Q-dots are best suited for photonics-based computing capable of achieving high speeds.



CONCERNS

- **Toxicity**:
  - Many quantum dots contain heavy metals like cadmium, lead, and selenium, which are toxic to humans and the environment.
  - Their release during manufacturing, usage, or disposal could pose health and ecological risks.
- **Environmental Impact**:
  - The production and disposal of QDs can lead to environmental pollution, especially if not properly managed.
  - The accumulation of heavy metals from QDs in soil and water could harm wildlife and ecosystems.
- **Stability**:
  - Quantum dots can be unstable under certain conditions, such as exposure to light, heat, or oxygen, which can degrade their performance and limit their long-term use in various applications.
- **Regulatory Challenges**:
  - The lack of standardised regulations for the use and disposal of quantum dots can create uncertainties for manufacturers and users, potentially hindering the adoption of QD technologies.
- **Cost**:
  - Producing high-quality quantum dots can be expensive, which may limit their accessibility and adoption in some industries, particularly for large-scale applications like solar cells and displays.
- **Long-term Safety**:
  - There is still limited research on the long-term effects of exposure to quantum dots on human health and the environment, making it difficult to fully understand and mitigate potential risks.

WAY FORWARD

- **Develop Safer Materials**: Research should focus on creating quantum dots using non-toxic, environmentally friendly materials to minimise health and ecological risks.
- **Implement Strong Regulations**: Establishing clear guidelines and regulations for the production, usage, and disposal of quantum dots can ensure safe handling and environmental protection.
- **Improve Stability and Durability**: Advancing the stability of quantum dots under various conditions will enhance their reliability and expand their applications in different fields.
- **Enhance Production Techniques**: Developing cost-effective and scalable manufacturing processes can make quantum dots more accessible and economically viable for a wider range of applications.
- **Invest in Long-term Safety Research**: Ongoing research into the long-term health and environmental impacts of quantum dots will help identify and mitigate potential risks.
- **Promote Industry Collaboration**: Encouraging collaboration between researchers, industry, and regulatory bodies can accelerate innovation and the responsible development of quantum dot technologies.

CONCLUSION

Quantum dots offer significant potential across various industries, but their safe and sustainable use requires addressing safety and environmental concerns. By developing safer materials, enhancing regulations, and improving production techniques, we can harness their benefits while minimising risks.

SAMPLE QUESTION

Q) How can we harness the benefits of quantum dots across various industries while addressing safety and environmental concerns? **(10 marks)(150 words)**

CONTRIBUTION OF SPACE SECTOR TO INDIA'S GDP

WHY IN NEWS

According to a Novaspace report, India's space sector has directly contributed about **$24 billion (Rs. 20,000 crore)** to India's Gross Domestic Product over the last decade.

Indian Space Sector

- India's space sector has benefitted from decades of consistent investment, with $13 billion invested in the last decade.
- It is the 8th largest space economy (in terms of funding) in the world.
- In the recently announced Union Budget for 2024-25, India's space sector received a significant boost. The Central government allocated ₹13,042.75 crore to support space-related initiatives.

CONTRIBUTION

- The space sector has supported **96,000 jobs** across both public and private sectors.
- For every dollar generated by the space sector, there was a **multiplier effect of $2.54 on the Indian economy.**
- Additionally, India's space workforce was found to be 2.5 times more productive than the country's overall industrial workforce.
- The sector is diversifying, now comprising **700 companies**, including 200 startups, and has seen its revenues grow to $6.3 billion in 2023, representing about 1.5% of the global space market.
- Satellite communications made up **54%** of the space economy, followed by navigation at **26%** and launches at **11%**.
- The primary industries supported by the space sector were telecommunications **(25%),** information technology **(10%),** and administrative services (**7%).**

SCOPE

- Currently, India's export market share in space-related services stands at ₹2,400 crore (about $0.3 billion).
  - The goal is to boost this to ₹88,000 crore ($11 billion).
- Rise of Space Tourism: In 2023, the space tourism market was valued at $848.28 million.
  - It is expected to grow to $27,861.99 million by 2032.

CHALLENGES

- **Funding Limitations:** Limited financial resources and the need for increased private investment.
- **Technological Dependence:** Reliance on foreign technology, affecting self-reliance.
- **Regulatory Gaps**: Need for updated policies to support private sector growth and innovation.
- **Global Competition:** Challenges from established space agencies and private companies.
- **Skilled Workforce:** Shortage of trained professionals in space science and engineering.

WAY FORWARD

- **Active participation of Private entities:** are now crucial in the field of research, manufacturing, and fabrication of rockets and satellites, fostering a vibrant ecosystem of innovation.
  - It is expected to integrate Indian companies into global value chains.
  - With this, companies will be able to set up their manufacturing facilities within the country duly encouraging 'Make In India (MII)' and 'Atmanirbhar Bharat' initiatives of the Government.
- **Increase Funding**: Boost government funding and incentivize private investments to support innovation and large-scale projects.
- **Develop Indigenous Technology**: Focus on R&D to reduce dependence on foreign technologies and enhance self-reliance in critical space technologies.
- **Enhance Global Collaboration**: Engage in strategic partnerships with international space agencies and companies to share knowledge, technology, and resources.

CONCLUSION

In conclusion, to sustain the growth and competitiveness of the Indian space sector, it is crucial to increase funding, develop indigenous technologies, strengthen regulations, and build a skilled workforce. By addressing these issues, India can continue to advance as a leading spacefaring nation and significantly contribute to the global space economy.

SAMPLE QUESTION

Q) Discuss the contribution of the Indian sector to India's GDP. Also disicare the key steps India can take to overcome the challenges in its space sector and ensure sustainable growth and global competitiveness? **(10 marks)(150 words)**

INVASIVE SPECIES

Syllabus: GS III - Environmental Pollution & Degradation; Conservation

PYQ MAPPING

Q) *How does biodiversity vary in India? How is the Biological Diversity Act, 2002 helpful in conservation of flora and fauna?* ***(2018)***

Q) *What is wetland? Explain the Ramsar concept of 'wise use' in the context of wetland conservation. Cite two examples of Ramsar sites from India.* ***(2018)***

SHORT TAKES

- **Alien Species:**
  - A species, subspecies, or lower taxon introduced outside its natural past or present distribution, including any part, gametes, seeds, eggs, or propagules.
- **Invasive Alien Species:**
  - An alien species whose introduction and/or spread threatens the biological diversity of the region/habitat.
- **Naturalised Species:**
  - Alien species that sustain self-replacing populations for several life cycles or a given period without direct intervention by people or despite human intervention.

WHY IN NEWS?

Recently, the Tamil Nadu Water Resources Department informed the National Green Tribunal that it has requested ₹160 crore from Kamarajar Port in Ennore to remove invasive charru mussels (*Mytella strigata*) that harm marine ecosystems and hinder fishing activities.

INTRODUCTION

The **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)** in its "**Assessment Report on Invasive Alien Species and their Control**" found that 37,000 alien species, including over 3,500 invasive species, have been introduced globally by human activities, contributing to 60% of recorded global plant and animal extinctions.

WHAT ARE INVASIVE ALIEN SPECIES (IAS)?

- The **Convention on Biological Diversity (CBD)** defines invasive alien species (IAS) as **"species whose introduction and/or spread outside their natural past or present distribution threatens biological diversity"**.
  - These include animals, plants, fungi, and even microorganisms, and can influence all kinds of ecosystems.
- The CBD, the United Nations' global treaty on safeguarding biological diversity, sums up characteristics of IAS as follows: **"arrive, survive and thrive."**
  - This means that these species need an introduction either through **natural** or **human intervention**, **survive on native food resources**, **reproduce at a fast rate**, and **edge out native species** in the competition over resources.
- In India, **IAS** are defined under the **Wildlife Protection Act, 1972 (amended in 2022)**, as **non-native species posing a threat to wildlife or habitats.**
- **Not all alien species establish and spread with negative impacts on biodiversity,** local ecosystems and species, but a significant proportion do – then becoming known as invasive alien species.
  - About 6% of alien plants; 22% of alien invertebrates; 14% of alien vertebrates; and 11% of alien microbes are known to be invasive, posing major risks to nature and to people.

INVASIVE ALIEN SPECIES IN INDIA

1. ***Mikania micrantha*** **(**billerwine**)**

- One of the most invaded plant in the Pacific and Asian countries, it was introduced in India around World War-1
- Manas and Kaziranga (Assam) national parks, Valmiki Tiger Reserve (Bihar) and Kerala.
- Early-stage invasion Central India and Himalayan foothills

2. ***Lantana camara*** **(**Lantana**)**

- Native of South America, it was Introduced in India as a decorative shrub in 1809.
- Nilgiri Biosphere Reserve (Tamil Nadu, Karnataka and Kerala), Central Indian Highlands, Himalayan foothills.

3. ***Senna tora*** (Sickle senna)

- An invasive weed native of South America, its introduction into India is unknown
- Sariska (Rajasthan) and Amarabad (Telangana) tiger reserves and Bandhavgarh National Park (Madhya Pradesh).

4. ***Prosopis juliflora*** (mesquite)

- Native to Mexico and South America, It was introduced In India in 1887.
- Kutch, Thar, Aravalli, and Deccan Plateau.
- Early-stage invasion in lower Himalayas, Northeastern hills.

5. ***Ageratina adenophora*** (cotweed)

- A weed indigenous to Central America, it was Introduced in the subcontinent in 1950s
- HImalayas, Western Ghats and Northeast.
- Early-stage invasion in dry forests of Central Indla.

6. ***Ageratum conyzoides*** (goat weed)

- A flower bearing plant native to tropical America and known to exist in India before 1882.
- Himalayan foothills, Terai and Northeastern hills.

7. ***Parthenium hysterophorus*** (congress grass)

- A poisonous weed introduced in India in 1954 as contaminants in imported wheat
- Agro-pastoral regions, along with riverbanks, roadsides, animal trails.

8. ***Mimosa diplotricha*** (giant sensitive plant)

- Native to Central and South America, it can form dense thickets quickly.
- Manas and Kaziranga (Assam) national parks, Valmiki Tiger Reserve (Bihar), Karnaloka.
- Early-stage invasion in Central India.

9. ***Xanthium strumarium*** (Common cocklebur)

- Native of North America and Argentina, the plant is drought-resistant.
- Mukundara National Park (Rajasthan), Nagarjuna Sgar Srisailam (Andhra Pradesh) and Sathya-mangalam (Tamil Nadu) tiger reserves.

10. ***Mesosphaerum suaveolens*** (Pignut)

- A herbaceous plant native to the South America and West Indies, its Introduction into India is unknown.
- Pench, Melghat and Tadoba Andhari tiger reserves in Central India.
- Early-stage invasion in Himalayan foothills.

11. ***Chromolaena odorata*** (siam weed)

- Belonging to the sunflower family, this South American shrub was introduced in India in the 1840s.
- Bandipur National Park and Nagarhole Tiger Reserve in Karnataka, Manas National Park (Assam), Mudumalai Tiger Reserve (TN).
- Early-stage invasion in Himalayan foothills, Central Indian highlands.

REASON FOR THEIR SPREAD

Human Activity and Trade

- **Example**: ***Lantana camara*** **(**a shrub native to Central and South America**)** was introduced as an ornamental plant and for soil erosion control. It has now become invasive in India, outcompeting native vegetation.

Agricultural Practices

- **Example**: ***Parthenium hysterophorus*** (Congress Grass) was introduced as a contaminant in imported seeds. It rapidly spread across agricultural lands in India.

Accidental Introduction

- **Example**: ***Achatina fulica*** (Giant African Snail) was accidentally introduced into India through international trade and has since spread across various states.

Climate Adaptation and Lack of Natural Predators

- **Example**: ***Mikania micrantha*** (Mile-a-minute Weed) thrives in the warm, humid conditions of the Northeastern states of India. Without natural predators or competitors, it spreads rapidly.

Biological Control Efforts

- **Example**: The introduction of ***Cane Toads*** (*Rhinella marina*) in Australia was intended to control sugarcane pests, but the toads became invasive and spread aggressively.

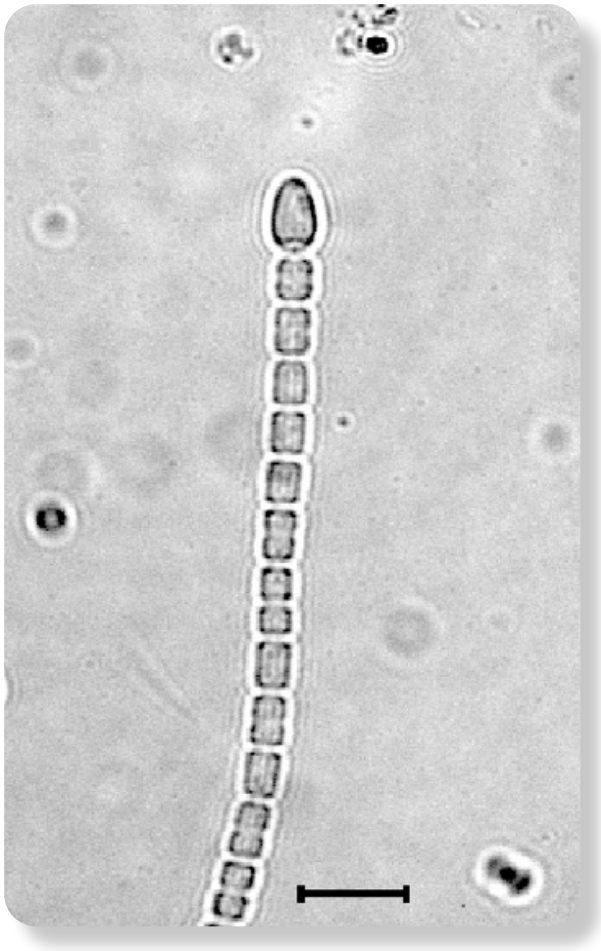
- ***Prosopis juliflora*** (Mesquite) was introduced to combat desertification but has become invasive in arid regions like Rajasthan and Gujarat, altering local ecosystems.

Changes in Land Use and Urbanization

- **Example**: ***Aedes aegypti*** (Yellow Fever Mosquito) has expanded its range in urban areas of India due to increased urbanisation and availability of breeding sites in stagnant water.

Global Climate Change

- **Example**: ***Cylindrospermopsis raciborskii*** (a harmful cyanobacterium) is spreading in freshwater bodies in India due to rising temperatures and changes in water conditions.



IMPACT ON INDIA

Biodiversity Loss

- **Displacement of Native Species**: Invasive species outcompete native flora and fauna, leading to a decline in biodiversity.
  - For example, ***Lantana camara*** and ***Parthenium hysterophorus*** dominate landscapes, reducing the variety of native plants and the animals that depend on them.
- **Disruptors of food chain:**
  - invasive species act as disruptors in the food chain and disturb the balance of the ecosystem.
  - Example: In **Keoladeo Park**, Bharatpur in Rajasthan, which is a UNESCO World Heritage site, the **African catfish** has been known to prey on water fowls and migratory birds as well
- **Habitat Degradation**:
  - Invasive plants like ***Prosopis juliflora*** alter habitats, making them unsuitable for native species, which can lead to local extinctions.
  - Studies have shown that the proliferation of **chital** in the **Andamans** has affected the regeneration of native vegetation, as the deer are known to consume seeds and seedlings.

Agricultural Impact

- **Crop Damage**: Invasive weeds like ***Parthenium hysterophorus*** and ***Ageratum conyzoides*** reduce crop yields by competing for nutrients, water, and light.
- **Pest Invasion**: Invasive insects and pathogens, such as the *Fall Armyworm* (***Spodoptera frugiperda***), **(most notorious invasive pest species on maize)** cause significant damage to crops, leading to economic losses for farmers.

Economic Costs

- **Control and Management**: The cost of managing invasive species, including mechanical removal, chemical treatments, and biological control methods, is substantial.
  - For example, controlling ***Water Hyacinth*** in water bodies requires continuous efforts and funding.
- **Loss of Livelihoods**: Invasive species can impact fishing and farming communities by reducing the availability of resources.
  - The spread of ***Mytella strigata*** **(Charru Mussel)** in coastal waters hinders fishing activities and affects the livelihoods of fisherfolk.

- **Caribbean false mussel** damaging locally important fishery resources in Kerala, by wiping out native clams and oysters.
- The Caribbean false mussel was originally from the Atlantic and Pacific coast of South and Central America, but are believed to have travelled to India via ships, later spreading to estuaries through smaller fishing vessels.

Ecosystem Disruption

- **Alteration of Ecosystem Functions**: Invasive species can alter key ecosystem processes such as nutrient cycling, fire regimes, and hydrology.
  - ***Eichhornia crassipes*** (Water Hyacinth) clogs waterways, reduces oxygen levels, and disrupts aquatic ecosystems.
- **Impact on Forests**: Invasive species like ***Mikania micrantha*** (Mile-a-minute weed) smother trees and reduce forest regeneration, impacting forest health and biodiversity.

Human Health

- **Health Hazards**: Certain invasive species pose direct health risks.
  - For instance, ***Parthenium hysterophorus*** causes allergic reactions and respiratory problems in humans.
- **Disease Vectors**: Invasive species like ***Aedes aegypti*** (Yellow Fever Mosquito) are vectors for diseases such as dengue, chikungunya, and Zika, impacting public health.

Water Resources

- **Water Body Degradation**: Aquatic invasive species like ***Eichhornia crassipes*** (Water Hyacinth) degrade water quality, affect fisheries, and increase the risk of flooding by obstructing water flow.

Cultural and Social Impact

- **Loss of Traditional Knowledge**: The displacement of native species by invasives can lead to a loss of traditional knowledge and practices related to the use of local plants and animals.
  - Invasive fish species such as the **Common Carp *(Cyprinus carpio*)** and **Tilapia *(Oreochromis mossambicus*)** have been introduced into various freshwater bodies in India.
  - These invasive fish species outcompete native ones, leading to declines in traditional fish populations. This disrupts local fishing practices, erodes cultural knowledge, and hinders its transfer between generations.
  - The spread of invasive species like ***Mikania micrantha*** in the **Northeastern states** and the **Western Ghats** has significantly affected **traditional agroforestry systems.**
- **Impact on Aesthetic and Cultural Values**: The spread of invasive species can alter landscapes and ecosystems, affecting their cultural and aesthetic value for local communities.

IMPACT ON WORLD

According to the **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)**, **34%** of the impacts of biological invasions were reported from the **Americas**, **31**% from **Europe** and **Central Asia, 25**% from **Asia** and the **Pacific** and about **7% from Africa**.

- Most negative impacts are reported on land (about 75%) – especially in forests, woodlands and cultivated areas – with considerably fewer reported in freshwater (14%) and marine (10%) habitats .
- Invasive alien species are most damaging on islands, with numbers of alien plants now exceeding the number of native plants on more than 25% of all islands.

Economic Costs

- According to the **Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)**, the global economic cost of IAS was over **$423 billion annually in 2019.**
  - These costs arise out of the damage IAS inflict on an area's natural ecosystem

Examples:

- **European shore crab** impacting commercial shellfish beds in **New England.**
- **Zebra Mussel (*Dreissena polymorpha*)- North America (Great Lakes)**
  - Zebra mussels filter large amounts of plankton from the water, altering food webs and reducing food availability for native species.
- **Brown Tree Snake (*Boiga irregularis*)- Guam, Pacific Islands**
  - The introduction of the brown tree snake to Guam led to the extinction of nearly all native bird species on the island, disrupting local ecosystems.

WAY FORWARD

Strengthen Regulations and Enforcement

- **Strict Biosecurity Measures**: Implement stringent biosecurity protocols at borders to prevent the introduction of invasive species through trade, travel, and other human activities.
- **Monitoring and Compliance**: Regularly monitor compliance with biosecurity regulations and impose penalties for violations.

Early Detection and Rapid Response

- **Surveillance Systems**: Establish and maintain robust surveillance systems to detect new invasions early. Use technology like remote sensing, drones, and citizen science initiatives to monitor high-risk areas.
- **Rapid Response Teams**: Develop and deploy rapid response teams to quickly address and contain newly detected invasive species before they become established..

Control and Management

- **Integrated Pest Management (IPM)**: Use a

combination of mechanical, chemical, biological, and cultural control methods to manage invasive species. Ensure that these methods are environmentally sustainable and minimise harm to native species.

- **Restoration of Ecosystems**: After removing invasive species, restore native ecosystems by reintroducing native plants and animals, and rehabilitating degraded habitats.

Awareness and Education

- **Awareness Campaigns**: Conduct public awareness campaigns to educate citizens, farmers, and industry stakeholders about the risks of invasive species and how they can help prevent their spread.
- **Community Engagement**: Engage local communities in monitoring, reporting, and managing invasive species. Empower them with the knowledge and tools to protect their local environments.

Research and Innovation

- **Genetic and Biological Control**: Explore genetic and biological control methods, such as using natural predators or introducing sterile individuals to reduce invasive populations. Ensure that these methods are safe and do not introduce new risks.
- **Climate Change Considerations**: Study the impact of climate change on the spread and behaviour of invasive species to anticipate future challenges and adapt management strategies accordingly.

International Collaboration

- **Global Partnerships**: Collaborate with other countries and international organisations to share knowledge, best practices, and resources for managing invasive species.
- **Cross-Border Initiatives**: Participate in cross-border initiatives to prevent the spread of invasive species through shared ecosystems, such as rivers, forests, and oceans.
- **Global Monitoring Systems**: Contribute to global monitoring systems and databases to track the movement and impact of invasive species worldwide.

Policy Integration

- **Incorporate IAS Management into National Plans**: Integrate invasive species management into broader environmental, agricultural, and land-use policies at the national and regional levels.
- **Sustainable Development Goals (SDGs)**: Align invasive species management efforts with the United Nations Sustainable Development Goals, particularly those related to biodiversity, climate action, and sustainable communities.

INITIATIVES RELATED TO MANAGEMENT OF INVASIVE ALIEN SPECIES

Global:

Convention on Biological Diversity (CBD):

- The CBD and its Parties including India recognize the urgent need to address the impact of IAS.
- Article 8(h) of the CBD states that each Party should prevent the introduction of, control, or eradicate alien species that threaten ecosystems, habitats, or species.
- The CBD sets global priorities, guidelines, collects information, and helps coordinate international action on invasive alien species.

Kunming-Montreal Global Biodiversity Framework:

- Target 6 of the recently adopted Kunming-Montreal Global Biodiversity Framework, an international agreement under the UN-CBD, requires member states, including India, to reduce the impacts of invasive alien species on biodiversity and ecosystem services by 50% by 2030.

IUCN Invasive Species Specialist Group (ISSG):

- Manages the Global Invasive Species Database (GISD) and the Global Register of Introduced and Invasive Alien Species.
- Provides information on invasive species across taxonomic groups to support management efforts.

India:

National Biodiversity Action Plan:

- It is a strategic document that aims to define the current state of biodiversity, the threats to its degradation, and the strategies to conserve and use it sustainably.
- The NBSAP also promotes equitable access to

biological resources.

- The Convention on Biological Diversity (CBD) considers NBSAPs to be one of its strongest implementation mechanisms.

- **National Action Plan on Invasive Alien Species (NAPINVAS):**
  - Launched by the Ministry of Environment, Forest and Climate Change (MoEFCC), NAPINVAS focuses on preventing new introductions, early detection, control, and management of established IAS.

- **National Invasive Species Information Center (NISIC):**
  - This centre provides information and resources on invasive species in India, raising awareness about the issue.
  - Plant Quarantine (Regulation of Import into India) Order, 2003:
  - Under the Department of Agriculture and Cooperation (DAC) it regulates the import of plants and plant material to prevent the introduction of IAS.

CONCLUSION

Invasive alien species pose a significant threat to biodiversity, ecosystems, and economies worldwide. Addressing this challenge requires a comprehensive and proactive approach, combining strict regulation, early detection, effective management, public awareness, and international collaboration. By integrating these strategies into policy and practice, we can mitigate the impacts of invasive species, safeguard native habitats, and promote ecological resilience for future generations.

SAMPLE QUESTION

Q) Discuss the impacts of invasive alien species globally and in India, particularly in agriculture, forestry, and fisheries? What strategies can effectively prevent and manage their spread to protect biodiversity and ecosystems? **(15 marks) (250 words)**

PRIME MINISTER'S INDEPENDENCE DAY ADDRESS

Prime Minister's 78th Independence Day speech was a comprehensive outline of India's future goals, focusing on innovation, self-reliance, and leadership in various sectors. Below is a detailed explanation of the key points he addressed:

1. **Swasth Bharat Mission**:
   - As part of the broader vision of **Viksit Bharat 2047,** PM stressed the importance of a healthy India through initiatives like the **Rashtriya Poshan Abhiyan.**
   - The PM said *"Viksit Bharat 2047 are not mere words; they are reflections of the resolve and dreams of 140 crore people"*.
   - The focus is on improving health outcomes across the nation, ensuring a healthier population by 2047.
2. **Ease of Living Mission**:
   - PM outlined his vision to fulfil **'Ease of Living'** on a mission mode.
   - The PM emphasised enhancing the quality of life in urban areas through systematic improvements in infrastructure and services.
   - This mission involves making urban living more comfortable, efficient, and sustainable, targeting better public transportation, waste management, water supply, and housing.
3. **Revival of Nalanda Spirit**:
   - The Prime Minister highlighted the goal of reviving the ancient Nalanda University spirit, which symbolises India's rich history in higher learning and research.
   - This initiative aims to position India as a global hub for education by promoting cutting-edge research and advanced learning, continuing the legacy of the recently inaugurated Nalanda University.
4. **Made in India Chip-Semiconductor Production**:
   - India aims to become a global leader in semiconductor production, reducing its dependency on imports and enhancing technological self-sufficiency.
   - This initiative is critical for India's ambitions in electronics, telecommunications, and automotive sectors, where semiconductors play a vital role.
5. **Skill India**:
   - The Prime Minister reiterated the importance of the Skill India initiative, aligning it with the 2024 Budget's focus on youth training.
   - India aspires to become the **skill capital of the world** by equipping its young population with the necessary skills to compete globally.
6. **Hub of Industrial Manufacturing**:
   - The PM envisioned India as a global manufacturing hub, leveraging its vast natural resources and skilled workforce.
   - The goal is to attract global investments, create jobs, and enhance India's industrial capabilities across various sectors.
7. **Space sector and startups:**
   - The PM also stressed how important the space sector is and noted that many changes have been made to improve it.
   - He also mentioned that more startups are getting involved in this area. *"Today, many startups are entering this sector. The space sector which is becoming vibrant is an essential element towards making India a powerful nation. We are focusing and giving strength to this sector with a long-term idea."*
8. **"Design in India, Design for the World"**:
   - The Prime Minister coined this phrase to emphasise the need for India to excel in indigenous design capabilities.
   - The focus is on creating products that cater to both domestic and international markets, showcasing India's creativity and innovation.
9. **Leader in Global Gaming Market**:
   - The PM urged India to leverage its rich cultural heritage and ancient literature to create Made in India gaming products.
   - He stressed the importance of Indian professionals not only excelling in playing games but also leading

in game development, making Indian games prominent on the global stage.

10. **Green Jobs and Green Hydrogen Mission**:

- The Prime Minister highlighted the significance of green jobs in India's fight against climate change, emphasising the creation of employment opportunities that contribute to environmental protection.
- He reiterated India's commitment to becoming a **global leader in green hydrogen production,** crucial for sustainable energy and environmental conservation.

11. **Uniform Civil Code:**

- The PM said *"I believe we should discuss the civil code in the country. Discriminatory laws need to be abolished, and we should implement a secular civil code. We need to transition from a communal civil code to a secular one."*

12. **One Nation One Election**

- **The PM said "***From the Red Fort, I urge the political community to support the idea of "One Nation, One Election." It is crucial for the nation to unite behind this initiative. Frequent elections create stagnation in the nation. Today, every scheme and initiative seems to be influenced by election cycles, and every action is coloured by political considerations"*

13. **State-level Investment Competition**:

- The Prime Minister called for state governments to create policies that attract investments and ensure good governance.
- This initiative is aimed at boosting confidence among investors by providing a stable and secure environment for business.

14. **Indian Standards as Global Benchmarks**:

- PM expressed India's aspiration to have its standards recognized internationally.
- The goal is to set benchmarks in quality that are globally respected, enhancing India's reputation in various industries.

15. **Climate Change Targets**:

- The Prime Minister reaffirmed India's ambitious goal of achieving **500 gigawatts of renewable energy capacity by 2030.**
- He noted that India has been the only country among the G20 nations to meet its Paris Accord goals.

16. **Medical Education Expansion**:

- PM Modi announced plans to add **75,000 new medical seats in the next five years,** addressing the growing demand for healthcare professionals.
- The PM said "*We want to build such an education system in India that youngsters do not need to go abroad to study. In fact we would want foreign students to come here and study*"
- This expansion is aimed at strengthening India's healthcare system and improving access to medical education.

17. **Milestones and achievements:**

- The PM also shared the significant milestones already achieved by his government.
  i. The **Jal Jeevan Mission**, which aims to provide potable water to every household, has now reached an impressive 15 crore beneficiaries.
  ii. He also touched upon the global promotion ofmillets, referred to as '**Shri anna**,' stating, *"People want 'shri anna (millets)' to reach every dining table in the world as a superfood."*

18. **Inducting Fresh Blood in Politics**:

- The Prime Minister called for the induction of **1 lakh youth into the political system**, particularly those with no political background.
- This initiative is aimed at combating nepotism and casteism in politics, bringing fresh perspectives and new ideas into the governance of the country.

These goals reflect an ambitious vision for India's future, focusing on innovation, self-reliance, and leadership across various sectors.

YOJANA - JUNE 2024

Architecture: Forts of India

INTRODUCTION

Forts, originally built for defence, evolved from natural barriers to sophisticated constructions using local resources and technology. Strategically located, hill forts utilised rocky terrains, while plains forts featured massive walls. Over time, they expanded to include residential and religious structures, serving broader functions beyond military purposes.

ROLE OF FORTS OF INDIAN HISTROY

In the Arthashastra, Kautilya categorises forts into six types based on their major modes of defense:

Types of Fort	Description
Jal-Durga (Water Fort)	Built on natural or artificial water bodies for defence Eg:
Dhanvana or Maru-Durga (Desert Fort)	Constructed in arid regions for protection
Giri-Durga (Hill Fort)	Located on hilltops for strategic advantage
Vana-Durga (Forest Fort)	Built in forests for camouflage and defence
Mahi-Durga (Earthen Fort)	Constructed using mud or clay
Nri-Durga (Human Fort)	Forts defended by a large number of experienced warriors.

MARATHA ARCHITECTURE FEATURES

- **Fortifications:** Emphasised strong defensive structures, including massive walls, bastions, and strategically placed watchtowers.
- **Temple Architecture:** Maratha temples often featured shikharas (temple spires), intricately carved pillars, and mandapas (assembly halls), with a focus on simplicity and functionality.
- **Wadas:** Traditional Maratha residential buildings, characterised by large courtyards, wooden pillars, and intricately carved wooden facades.
- **Colonnades and Verandas:** The use of colonnades and wide verandas in both public and private buildings provided shade, ventilation, and a sense of openness, suited to the region's climate.
- **Water Management:** Ingenious use of water systems, including step wells, tanks, and reservoirs within forts and palaces for rainwater harvesting and storage.

- **Blend of Styles:** Maratha architecture often combined indigenous elements with influences from Mughal, Rajput, and Deccan styles, creating a unique hybrid aesthetic.

RAJPUT ARCHITECTURE FEATURES

- **Fortifications:** Massive forts with thick walls, bastions, and intricate gateways, often built on hilltops for strategic defence.
- **Palaces (Mahals):** Grand palaces featuring courtyards, pavilions, and elaborate decorations, with a focus on aesthetics and grandeur.
- **Temples:** Rajput temples are known for their shikharas (spires), intricate carvings, and ornate sculptures, often depicting deities, mythological scenes, and floral motifs.
- **Jharokhas:** Projected balconies or overhanging enclosed windows, used for viewing and ventilation, often adorned with latticework.
- **Chhatris:** Elevated, dome-shaped pavilions that served as memorials, reflecting the Rajput's respect for their ancestors and warriors.
- **Water Structures:** Step wells (baoris) and reservoirs, ingeniously designed for water conservation, with artistic carvings and multi-storied steps.
- **Use of Local Materials:** Extensive use of locally available sandstone, marble, and granite, with a preference for white and red hues.
- **Decorative Elements:** Extensive use of murals, frescoes, and mirror work (sheesh mahal) to enhance the interiors of palaces and havelis.

DEFENCE ARCHITECTURE FORTS OF ANDHRA PRADESH & TELANGANA

- **Kondapalli Fort:** Located in the NTR district, Kondapalli Fort exemplifies Indo-Saracenic architecture, blending Indian and Persian influences. It has witnessed rule under various dynasties, including the Western Chalukyas and Qutb Shahis, making it a significant historical site.
- **Kondaveedu and Addanki Forts**: These forts, initially strongholds of the Reddy kingdom (subordinates of Kakatiyas of Warangal), played key roles in regional power struggles, facing conflicts involving the Gajapatis, Bahmani and Vijayanagara Empire, and later the Qutb Shahis.
- **Udayagiri Fort**: Situated strategically in the PSR Nellore district, Udayagiri Fort was crucial during the Vijayanagara rule and was later annexed by the Qutb Shahis. The Krishna temple in it was significant as Krishnadevaraya carried the Balakrishna idol to Hampi and reinstalled it in the temple in 1515 AD.

- **Gooty Fort**: Located in the Anantapuramu district, it is a large fortification that gained status of Rajya under the Vijayanagara monarchs and was then annexed by various rulers and eventually occupied by East India Company from Hyder Ali.
- **Penugonda Fort:** Once the capital of the IV dynasty of Vijayanagara kings, Penugonda Fort faced multiple attacks from Adil Shahi and Qutb Shahi forces, marking it as a site of significant historical conflicts.

- **Chandragiri Fort:** Located in Tirupati district of Andhra Pradesh, the structure also contains a Rani mahal and Raja Mahal as well as a couple of temples. During the late 16th century the capital of Vijayanagara was shifted from Penukonda to Chandragiri.
- **Gandikota Fort:** Located in the YSR Kadapa district of Andhra Pradesh, the fort is situated near Pennar river and is similar to Golconda Fort. It was later annexed by Qutb Shahi dynasties and was eventually taken over by the British east India company.

IMPORTANT FORTS IN TELANGANA

- **Warangal Fort:** Known for its Kakatiya legacy, Warangal Fort features a unique circular design with concentric fortifications that reflect the advanced mediaeval fortification techniques of the time. Despite repeated invasions, the fort's design allowed it to serve as a formidable stronghold, maintaining its significance through various periods.
- **Bhongir Fort:** Located in the Yadadri district of Telangana, it was initially under the Kakatiya rule. It was also held by Allaudin Khilji, Ahmad Shah Bahamani etc. Finally the fort was taken over by Nizams.
- **Koilkonda fort:** Located in the Mahbubnagar district of Telangana, it was a border between the Vijayanagara and Qutub Shahi kingdoms. It was for a brief period controlled by Bijapur forces and was regained by Sultan forces.
- **The Elgandal Fort:** Located in the Karimnagar district of Telangana, the fort was also known as Veligundala and was said to be built during Kakatiyas. It was held by various powers like Musunuri Nayakas, Qutb Shahi rulers, Mughals, and finally into the Nizams

GOLCONDA FORT: THE IMPENETRABLE FORTRESS

- **Golconda Fort:**
  - The word Golconda is derived from the Telugu Word “Golla Konda” which means a shepherd’s hill.
  - The fort was first ruled by the Kakatiyas but in 1363AD, it was taken over by the Bhamanis.
  - Sultan Quli, who founded the Qutb Shah Kingdom in 1518 AD, made it the capital.
  - Golconda was known for its diamond markets.
  - Important structures in the fort include Fateh Darwaza, Katora house, Dhaan Kotha, Jama E masjid, Bala Hisar, Curtain Wall, Mortuary Bath, etc.

FORTS OF GUJARAT: GUARDIANS OF LEGACY AND LORE

- **Uparkot Fort, Junagadh:** Built in 319 BC by the Mauryan Emperor Chandragupta, consists of a set of Buddhist caves as well as two fine step wells. It was restored in 1893-94 by Haridas Viharidas, The Dewan of Junagadh state.
- **Pavgadh Champaner fort:** Situated atop a volcanic hill near Champaner, it is a UNESCO World Heritage Site (since 2004 July) built in the 8th century during the Chavda dynasty and then passed onto Solanki Rajputs, Khichi Chauhans and the Gujarat Sultanate. It was captured in 1535 by Humayun and the capital was shifted to Ahmedabad, which ruined the fort.

- **Diu Fort:** Situated on the island of Diu off the coast of Gujarat it is one of the seven wonders of Portugese Origin in the world. It was a product of the alliance between Bahadur Shah, the sultan of Gujarat and the Portugese against the mughals. It was built by D Nuno da Cunha and rebuilt by D Joa de Castro. It includes several structures like St. Paul's church, St. Thomas church, the Chapel of our lady of Rosary etc.
- **Bhujiya Fort:** Located on the top of Bhujiya hill in the Bhui district of Kutch, it is named after Bhujang, a snake god worshipped by the people. It was constructed in 1715 by Rao Godji I, the Kutch ruler and had resisted a series of military attacks between 1700 and 1800 AD.

- **Bhadra Fort:** Situated in the walled city area of Ahmedabad, the fort got its name from a temple of Bhadra Kali established during the Maratha rule. It was also known as Aark Forest and was a symbol of Gujarat Sultanate.it was under the british control since 1817 and was renovated by the govt in 2014. The clock tower located in the fort is of great significance.

FORTS IN DELHI

- **Lal Kot:** Built in the 11th century by Anagpal of the Tomar dynasty, it is the oldest fort of Delhi and was extended by Prithviraj Chauhan. It was then called Qila Rai Pithora, the first of the seven cities of Delhi.
- **Adilabad fort:** Built in 1327-28 AD by Muhabbad Bin Tughluq, it was an extension of Tughlaqabad fort.
- **Purana Qila:** Built by the Mughals in 1530s, it was also called Qila-e-Kohna this is believed to be in the same place of Indraprastha, the legendary capital of the Pandavas.It includes many structures including Qal'a-i-Kuhna, A mosque built by Sher Shah in 1541 AD, Sher Mandal, which was probably a library, Lal Darwaza and Khairul Manazil.The fort was abandoned when capital was shifted to Agra.

- **Red Fort:** Commissioned by the mughal emperor Shah Jahan in 1638 as the palace fort of Shahjahanabad, the new capital city and designed by Ustad Ahmad Lahauri, it was the main residence of the Mughals for 200 years. A mix of various architectural styles, it is here that Pm hoists the Indian flag on independence day. Salimgarh fort is adjacent to it. Lahori gate, Chhatta Chowk etc are in it. The site was added to the UNESCO World Heritage List in 2007.

BEKAL: A FUSION OF CULTURE AND HISTORY ECHOING THROUGH TIME

- **Bekal Fort:**
  - » Located in Kasargod across 40 Acres near Arabian sea, the fort was a part of Mahodayapuram kingdom as well as Kolathunadu in the 12th century.
  - » It was conquered by the Nayakas in the 16th century.
  - » Hiriya Venkatappa began its construction and was completed by Sivappa Nayak.
  - » The fort reached British hands when Tippu fell in 1799.

VELLORE FORT: THE GREAT GARRISON OF SOUTH INDIA

- **Vellore Fort:**
  - » Known as the " Iron throne of south India", it was the golden seat of Pallavas, Cholas, Marathas, Bijapur sultans, Arccot Nawab dynasties etc.
  - » It is situated in Chennai.
  - » Built by Vijayanagara rulers, the fort witnessed the infamous Vellore mutiny.

MEDIEVAL PORTS AND FORTS

- **Chaul Fort:** Located in Maharashtra, it is popularly known as Agarkot, it was officially called Rajkot. Marco Polo regards it as a muslim town.
- **Revdanda Fort:** Situated on the north bank of Kundalika River,it also served as a port.Marco Polo regards it as a Portugese town.
- **Korlai Fort:** Located in the mouth of Kundalika creek,, Burhan Nizam Shah of Ahmadanagar built a fort here which was captured by the Portugese in 1594 and then by the British in 1646.
- **Birwadi Fort:** Situated in the town of Roha, it is located perpendicular to Sahyadri ranges. Constructed by Chhatrapati Shivaji for strategic reasons.
- **Avchitgad fort:** A hill fort located at the town of Roha to the north of Kundalika river, it was built by Shivaji.
- **Janjira Fort:** The fortified island near Danda Rajpuri commonly called Janjira fort is an island fort in Maharashtra. It was a major trading port.

MARATHA MILITARY LANDSCAPE OF INDIA

- **UNESCO Nomination 2024-25:** "Maratha Military Landscapes of India" will be India's nomination for the UNESCO World Heritage List, featuring 12 significant forts
- **Geographical Distribution:** The selected forts are **spread across Maharashtra and Tamil Nadu,** representing various strategic and military landscapes in regions like the Sahyadri mountain ranges, Konkan Coast, Deccan Plateau, and Eastern Ghats.
- **Forts Selected**: The 12 nominated forts are Salher, Shivneri, Lohgad, Khanderi, Raigad, Rajgad, Pratapgad, Suvarnadurg, Panhala, Vijaydurg, Sindhudurg (Maharashtra), and Gingee (Tamil Nadu).
- **Historical Significance**: These forts, developed between the **17th and 19th centuries under Maratha rule**, highlight the military prowess and strategic vision of Maratha rulers, particularly during the reign of Chhatrapati Shivaji Maharaj.
- **Protection Status**: Eight of these forts are protected by the Archaeological Survey of India, while the remaining four are under the Directorate of Archaeology and Museums, Government of Maharashtra.

ETHICS - CASE STUDY

Q) You have been appointed as a senior Superintendent of Police in one of the communally sensitive district of your state. A terrorist involved in a serial bomb blast case has been given capital punishment recently. A local communal organisation has asked the police for permission to carry out a procession on the day of execution of the death penalty. The situation is very sensitive as many in the community to which the terrorist belongs feels that justice has not been done to the terrorist. You have been asked to take the decision regarding the permission of the procession. Allowing such activities may lead to communal clashes and not allowing them can further fuel the negative sentiments of the community towards the government.

a. Analyse the situation from different stakeholder perspectives.
b. What will be your course of action?

ETHICS - EXAMPLES

1. **Environment Ethics**: Twenty-four-year-old Aditi Pillai, a Stanford graduate living in Muttukadu, is organising a beach clean-up drive on August 24 with support from her neighbours and local students. Through her NGO, Green Habit, she aims to foster sustainable environmental practices and plans to continue such initiatives regularly.
2. **Lack of Personal Morality**: Civic volunteer Sanjoy Roy, accused of the rape and murder of a doctor in Kolkata, was found to have a history of violent behavior, including multiple marriages, domestic abuse, and an addiction to disturbing pornography.
3. **Ethics in Education**: A video of a physical education teacher from a private school in Salem, identified as Annamalai, assaulting students for not performing well in a football match went viral. Salem District Chief Educational Officer stated that a show cause notice would be issued, and action would be taken against the teacher.
4. **Workplace Ethics:** Medical students and doctors at Government Medical College, Thrissur, were advised to carry pepper spray and a whistle for safety during odd hours, given the dangers of isolated hospital corridors at night and urged the government to ensure a safe working environment.
5. **Accountability**: The Delhi High Court ordered Bhalswa's dairy colony to relocate due to milk quality concerns linked to a nearby landfill. Residents, who have run the dairy for decades, argue they are being unfairly punished for the landfill's issues and criticise the Municipal Corporation of Delhi for not addressing the garbage problem.
6. **Community Engagement/Crisis Management**: In Manipur, artist-singer Chaoba Thiyam is using art to help children in relief camps express their trauma, leading initiatives like a music room and art sessions to provide emotional relief. His efforts have created a creative outlet for displaced children who have found solace and a new passion for music amidst the conflict.
7. **Accountability**: Himachal Pradesh CM Sukhvinder Singh Sukhu has revamped the Annual Performance Appraisal Report (APAR) system for IAS and other Class I and II officers, introducing a numerical grading scale of 1 to 10 and negative marking for non-compliance with government orders. The new system will assess officers based on their work plans, attributes, and performance.
8. **Environmental Ethics:** Farmers across Australia are using fungi to pull carbon dioxide from the air and store it underground as part of a climate change mitigation strategy. Companies like Loam Bio are pioneering this approach, investing heavily in soil-based carbon removal technologies alongside other ventures experimenting with microbes, volcanic rocks, and charcoal to tackle atmospheric carbon pollution.
9. **Privacy**: Facing financial difficulties, many Olympic athletes are resorting to selling images of their bodies on OnlyFans to fund their training and living costs, exposing deficiencies in the funding system. The International Olympic Committee (IOC) has shown little concern about this trend, stating that athletes are free to manage their financial situations as they wish.

MODEL ESSAY

"When the winds of change blow, some people build walls and others build windmills"

Introduction

- Ancient Chinese Proverb
- Explain the metaphor: Walls represent resistance to change, while windmills symbolise harnessing change for progress.
- The ability to adapt and leverage change is crucial for individual and societal growth.

Reasons to resist change

- **Fear of the unknown:** Uncertainty about the outcomes of change can be unsettling.
- **Loss of control:** Feeling like one has less autonomy or decision-making power in the new situation.
- **Disruption of routines:** Established habits and routines provide comfort and security.
- **Economic concerns:** Fear of job loss, reduced income, or financial instability.
- **Lack of trust:** Distrust in leadership or the change process itself.

Consequences of Resistance to Change

- **Stalled progress:** Resistance can hinder advancement **Eg**: Kodak's resistance to digital photography led to its decline
- **Missed opportunities:** New possibilities and solutions may be overlooked.
- **Increased stress and anxiety:** Uncertainty and discomfort can arise from resisting change.**Eg**: Employees transitioning to remote work during the COVID-19 pandemic
- **Reduced adaptability:** A persistent resistance can limit ability to navigate challenges. **Eg**:Nokia's resistance to adopting smartphones with touchscreens and advanced software systems

Benefits of change

- **Growth and Development:** Change often stimulates growth, leading to new skills and perspectives.**Eg**: Satya Nadella's cultural shift at Microsoft in 2014-"growth mindset"-leading to the company's resurgence in cloud computing and AI.
- **Improved Efficiency and Productivity:** New approaches and technologies can streamline processes and enhance performance. **Eg**: Toyota's "Kaizen" philosophy improved production
- **Enhanced Competitiveness:** Adapting to change is necessary to stay ahead of competition. **Eg**: Netflix's transition from DVD rentals to streaming services allowed the company to outpace competitors like Blockbuster,

Importance of Balance

- Acknowledge that both approaches have their place in certain situations.
- **Eg**: Individuals who set boundaries while remaining open to new experiences.
  - » Societies that preserve cultural heritage while embracing modernity.

Conclusion

- Reiterate the importance of responding positively to change.
- Emphasise the long-term consequences of building walls versus windmills.
- Offer a final thought on the role of individuals in shaping the future through their response to change.

Sample Quotes

- *What is now proved was once only imagined.- William Blake*
- *Innovation is the ability to see change as an opportunity, not a threat- Steve Jobs*
- *The value of an idea lies in the using of it- Thomas Edison*

MAINS JOT DOWN

GS- II - *HEALTH*

- Indigenous tetravalent dengue vaccine, **DengiAll** has proceeded toward its phase-3 clinical trials.
- Trial would be conducted with collaboration of Indian Council of Medical Research and Panacea Biotec.
- Dengue
  - » Viral infection that transmits with the bite of an infected female Aedes mosquitoes (also responsible for chikungunya, Zika).
  - » Dengue is found in tropical and sub-tropical climates worldwide, mostly in urban and semi-urban areas.

GS- III - *GOVERNMENT POLICIES AND INTERVENTIONS*

- **NITI Aayog** publishes a Report on Impact Assessment of **Pradhan Mantri Mudra Yojana.**
- Report has analysed performance and contribution of the PM Mudra Yojana under the Ministry of Finance towards Micro, small, medium enterprises (MSMEs).
- **Key Finding:**
  - » Since its launch in 2015, the scheme has provided credit support to 35 crore Micro and Small entrepreneur Accounts.
  - » Women held around 71% of the total number of accounts (FY 2022). Sanctioned amount for new entrepreneurs has also increased.
  - » Number of accounts & amount sanctioned for the Northeast region is not only the lowest but is also decreasing.

GS- II - *INTERNATIONAL RELATIONS*

- The **6th India-Australia Maritime Security Dialogue** was held on 13 August, 2024 in Canberra.
- The two sides conferred on ways to sustain a safe and secure maritime environment conducive for inclusive growth and global well being.
- They exchanged views on various topics of mutual interest, including the maritime security environment in the **Indo-Pacific region, maritime domain awareness, Humanitarian Assistance and Disaster Relief (HADR) coordination, regional and multilateral engagements and sustainable use of marine resources**.
- This included cooperation in **Search and Rescue (SAR), pollution response, blue economy and Port State control.**
- They also conferred on the way ahead for collaboration in the maritime ecology pillar of the Indo-Pacific Ocean Initiative (IPOI).
- India and Nepal signed a MoU to provide grant assistance for the launch of **Nepal's Munal Satellite**
- The collaboration highlights the growing role of **space technology in diplomacy.**
- Munal Satellite is an **indigenous satellite developed in Nepal** that aims to build a vegetation density database of the Earth's surface.
- The satellite will use NewSpace India Limited's (NSIL) Polar Satellite Launch Vehicle.

GS- III - *DEFENCE*

- Recently, DRDO successfully test-fires indigenously built **Man-Portable Anti-Tank Guided Missile (MPATGM).**
- MPATGM Weapon System
  - » It is a shoulder-launched, portable missile system, specifically designed to counter enemy tanks and armoured vehicles.
  - » It consists of a Launcher, Target Acquisition System, and Fire Control Unit.
  - » It is equipped with advanced infrared homing sensors and integrated avionics which makes it versatile in both day and night operations.
- Defence Research and Development Organisation (DRDO) carries out a successful **maiden flight test of Long Range Glide Bomb 'GAURAV'** from Su-30 MK-I platform.
- **GAURAV**
  - » An air launched 1,000 kg class glide bomb capable of hitting targets at long distance.
  - » Glide bombs after launch steer towards the target using a highly accurate hybrid navigation scheme with a combination of Indian Navigation System (INS) and Global Positioning System (GPS) data.

GS- III - *AGRICULTURE*

- Agriculture Minister inaugurates AI based platform, **National Pest Surveillance System (NPSS)**
  - » NPSS will provide regular correct pest management advisories and will promote Integrated Pest Management.
  - » It is under the Directorate of Plant Protection, Quarantine & Storage (Ministry of Agriculture).
- The Union Cabinet approved the **Clean Plant Programme (CPP),**which will be a major leap forward in the Horticulture Sector.
- Supported by a substantial investment of Rs. 1,765.67 crore and spearheaded by the Ministry of Agriculture and Farmers Welfare, the CPP aims to enhance the quality and productivity of fruit crops across the country.
- This initiative will set new benchmarks for excellence and sustainability in agriculture.
- **Clean Plant Programme (CPP)**
  - » CPP is designed to address critical issues in horticulture by providing access to high-quality, virus-free planting material.
  - » The programme is poised to deliver numerous benefits across various stakeholders, from farmers to consumers, and bolster India's position in the global fruit market.

GS- III - *DISASTER MANAGEMENT*

- Union Minister for Jal Shakti, launched the **Version 2.0 of the 'FloodWatch India'** mobile application developed by the **Central Water Commission** (CWC).
- The Central Water Commission (CWC) launched a mobile app on August 17, 2023, to provide real-time flood information and forecasts.
- While the initial version covered 200 flood forecast stations, Version 2.0 now includes **592 stations** and adds details on the storage status of 150 major reservoirs, offering a comprehensive overview of flood conditions and potential downstream impacts.

GS- I - *IMPORTANT GEOGRAPHICAL PHENOMENONS*

- Japan issues its **first-ever megaquake** advisory on the Nankai Trough in Japan's Southwest Pacific Coast.
- Megaquakes are Earthquakes with a magnitude **greater than 8.**
- The **Nankai Trough** is an underwater subduction zone where the Eurasian Plate collides with the Philippine Sea Plate.

CHERRYPICKS OF THE WEEK

ROSSBY WAVES

- The **meandering jet streams** are called Rossby Waves.
- Rossby waves are a natural phenomenon in the atmosphere and oceans due to rotation of earth.
- In planetary atmospheres, they are due to the variation in the Coriolis effect (When temperature contrast is low, speed of jet stream is low, and Coriolis force is weak leading to meandering) with latitude.
- Rossby waves are formed when polar air moves toward the Equator while tropical air is moving poleward.

OROPOUCHE FEVER

- It is caused by the **Oropouche virus**, which is transmitted most often through the bite of the ***Culicoides paraensis*** midge.
- There is no evidence of human-to-human transmission of the disease — to date.
- Symptoms of the disease are similar to dengue and typically start between four and eight days after the bite.
- The onset is sudden, and symptoms usually include fever, headaches, pain, chills, joint stiffness and sometimes nausea and vomiting.
- Most patients recover in about seven days. According to the WHO, severe cases are rare.
- There is no specific vaccine or antiviral treatment available for the disease.

WATERSPOUTS

- They are significant **atmospheric phenomena** characterised by rotating columns of air that form over water bodies.
- These tornado-like structures typically develop overseas or in large lakes, presenting a spectacular display of nature's power.
  - It is a weaker version of a tornado, typically lasting 5-10 minutes.
  - The average diameter is around 165 feet (50 metres).
  - Wind speeds can reach up to 100 km/h (60 mph).
- **Formation**:
  - Fair-weather waterspouts occur when cool air flows over open water, pulling water upwards and creating the waterspout.
  - Tornadic waterspouts are more likely to form during thunderstorms. Some may even start as tornadoes on land and then move over water. These waterspouts typically develop in the sky and extend downward.
- While **most common in tropical and subtropical regions**, waterspouts can occur in various parts of the world, including Europe, the Middle East, and even Antarctica.

SURROGATE ADVERTISING

- It is a marketing technique used by companies to indirectly promote their products or services, which are prohibited or restricted from advertising directly.
- It promotes a brand or a product that is similar to the banned product, but not the same, in order to create brand awareness and visibility.
- It is commonly used in industries such as alcohol, tobacco, and gambling, where direct advertising is either illegal or highly regulated.
- For example, a company that sells alcoholic beverages may advertise its brand of mineral water, which carries the same logo and brand name as the alcohol product but does not mention the alcohol product itself.

LEQEMBI (LECANEMAB)

- It is an antibody intravenous (IV) infusion therapy that targets and removes beta-amyloid from the brain
- It is a prescription medicine used to treat people with **Alzheimer's disease.**
- LEQEMBI can cause serious side effects, including:
  - ARIA (amyloid-related imaging abnormalities)
  - Serious allergic reactions
  - Infusion-related reactions