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The **Current Affairs based MCQs** of the April 2023 Issue of Civil Services Chronicle Magazine is available at **www.chronicleindia.in** under the **Free Resources** section

Ethics of Artificial Intelligence
Issues of Concern Related to Use of AI

Artificial intelligence (AI) is often deployed with intentions of improving access and quality and higher efficiency and solving pressing problems. However, risks and challenges of leveraging AI have also emerged across a number of different areas. New products and platforms are being designed by employing artificial intelligence. This creates the need for responsible and ethical use of AI and prevent its misuse for fraudulent activities. This is because ethical violations in AI processes, especially in areas such as health, education, financial markets, economy, housing and transportation could result in massive disruptions in the lives of a large number of people on a scale, hitherto, unimagined.

■ **Deepika Singla**

In the present era, Artificial Intelligence has been deeply embedded into Human lives. Face recognition, voice assistants, navigation, autofills, etc. are the most common day-to-day features deploying artificial intelligence. The launch of ChatGPT by OpenAI has revolutionized the manner in which powerful Artificial Intelligence systems can be accessed by common people. Similarly, tech giant Microsoft has also incorporated AI based systems in its search engine Bing. Google is also reportedly trying to launch a similar tool. With the rapid spread of AI based tools, concerns such as misuse of AI chatbots, deepfakes, impersonation, hacking, etc. have emerged.

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What is AI Ethics?

AI ethics is a set of guidelines that advise on the design and outcomes of artificial intelligence.

• AI ethics is a systematic normative reflection based on a holistic, comprehensive, multicultural and evolving framework of interdependent values, principles and actions. This framework can guide societies in dealing responsibly with the known and unknown impacts of AI technologies on human beings, societies and the environment and ecosystems, and offers them a basis to accept or reject AI technologies.

• AI ethics is based on the core ideas of ensuring human dignity, social well-being and the prevention of harm.

Why does AI Ethics matter?

• It is important that ethical considerations are designed and built into AI solutions from the outset because of following:

• AI has become integral to human lives. It is now commonly used in various products and services availed by us. As intelligent systems interact with humans either directly or indirectly, machines are increasingly becoming an integral part of the functioning of society.

• AI has the potential to make intelligent and autonomous decisions, thus there is the question of personhood for machines and the potential that machines will evolve into members of the society.

• Poorly designed projects built on data that is faulty, inadequate or biased can have unintended, potentially harmful, consequences.

• No human being or human community should be harmed or subordinated, whether physically, economically, socially, politically, culturally or mentally. AI Ethics help in respect, protection and promotion of human rights and fundamental freedoms and human dignity.

Thus, the implementation of ethics is crucial for AI systems for various reasons such as to provide safety guidelines that can prevent existential risks for humanity, to solve any issues related to bias, to build friendly AI systems that will adopt our ethical standards, and to help humanity flourish.

Use of AI: Issues of Concern & Challenges

• **Explainability**: Organizations that are using AI systems are unable to explain the source of data. Thus, AI needs to have a strong degree of traceability to ensure that if any harm arises, it could be traced back to the source of origin.

• **Responsibility**: There is no mechanism to enforce responsibility for the catastrophic consequences of decisions made by AI systems. Fixing responsibility for AI systems would prevent loss of capital, health or life.

• **Fairness**: AI systems have inherent biases built into them as the data it uses comes from the biased human behaviors. Thus, quality and credibility of the data is

Digital Connectivity Infrastructure
Role in India's Socio-economic Development

Digital communication has become an integral and indispensable part of modern society. India along with other nations is moving towards an economic system which is based on continuous and ubiquitous availability of digital information. Financial services (like banking, capital markets, and insurance) and crucial services like e-governance, tele-medicine, entertainment, online e-commerce sit atop the underlying architecture of telecom networks and services. A robust Digital Connectivity Infrastructure (DCI) contributes significantly to economic development both by increasing productivity and by providing amenities that enhance the quality of life. DCI is also boosting the data economy like never before.

■ Ranjeet Shah

Recently, the Telecom Regulatory Authority of India (TRAI) released a consultation paper on the '*Introduction of Digital Connectivity Infrastructure Provider Authorization under Unified License (UL)*'.

◆ In context of DCI development, various countries have aligned their telecom licensing framework to increased utilization of resources (including spectrum), reduction of cost, attract investment and strengthen the service delivery segment by segregating the infrastructure/network layer and service/ application layers.

◆ The advantage of such frameworks is that they simplify the licensing process and provide a more conducive environment for market growth and improvement of the socio-economic welfare of society while considering the convergence of technologies.

◆ The purpose of this Consultation Paper (CP) on '*Introduction of Digital Connectivity Infrastructure Provider Authorization under Unified License (UL)*' is to seek views of stakeholders on the proposed DCIP authorization under Unified License.

◆ Before going into details about importance of ***Digital Connectivity Infrastructure*** (DCI), let us get acquainted with definition of DCI. DCI enables the transmission of data in digital formats through different physical channels. Information is more efficiently transmitted when translated into digital data, which need to be sent over physical channels (e.g., electrical, optical, radio-electric signals) carried-out by a transmission medium (e.g., copper wire, fiber - optic, radio-electric spectrum). Thus, the infrastructure supporting transmission mediums through which digital data flow, along with their transmitter and receiver equipment, can be referred to as digital connectivity infrastructure.

Why Digital Infrastructure is important for India?

While the role of traditional infrastructure has been well recognised, in recent years, the role of digital infrastructure in socio-economic development of the country has assumed an increased importance. This was especially true during the Covid-19 period when the curtailment of physical interactions necessitated the utilisation of digital infrastructure already available for service delivery and remote work.

However, India with over *1.3 billion+ population* and moreover with an increasing use of smartphones and the internet, there is a growing demand for digital services, including e-commerce, online education, tele-medicine, and digital payments and much more.

Thus, Digital infrastructure is important for India for a number of reasons:

◆ **Bridging the Digital Divide:** India has a large population, and a significant portion of it lives in rural and remote areas. Digital infrastructure can help bridge the digital divide by providing access to digital connectivity, education, healthcare, financial services, and other essential services to these areas.

◆ **Economic Development:** Digital infrastructure is a key enabler of economic growth and development. It provides a platform for innovation, entrepreneurship, and job creation. It also facilitates e-commerce, digital payments, and other online activities that are essential for a modern, digital economy.

◆ **Government Services:** Digital infrastructure can help the government deliver services more efficiently and effectively. It can reduce the time and cost of delivering services, improve transparency and accountability, and enhance citizen engagement.

◆ **Education and Healthcare:** Digital infrastructure can help improve access to education and healthcare services. It can provide online learning platforms, telemedicine services, and other digital solutions that can reach even the most remote areas of the country.

Protecting Marine Biodiversity
A Step towards Ocean Sustainability

Protecting marine biodiversity is crucial for the health and sustainability of our oceans and the many species that depend on them. Ultimately, the protection of marine biodiversity is a shared responsibility that requires the collaboration and cooperation of individuals, communities, governments, and organizations around the world.

■ **Chandrakant Singh**

The Fifth Session of the Intergovernmental Conference (IGC5) on an international legally binding instrument under the UN Convention on the Law of the Sea (UN-CLOS) on the conservation and sustainable use of marine biological diversity of areas beyond national jurisdiction (BBNJ) was held in New York from 20th February to 3rd March, **2023**.

The goal of the Intergovernmental Conference (IGC5) is to produce a unified agreement for the conservation and sustainable use of vast marine biological resources in the high sea.

A global oceans treaty is needed actually to enforce the U.N. Biodiversity Conference's recent pledge *to protect* 30% of the planet's oceans, as well as its land for conservation.

Need of Ocean Protection Treaty or High Seas Treaty

➢ Currently, two-thirds of the ocean lies outside national boundaries on the high seas where fragmented and unevenly enforced rules are incapable to reduce human impact.

➢ With expansion of deep sea fishing, deep sea mining, plastic pollution and climate change, biological diversity of high seas are continuously under threat.

➢ Ocean protection treaty is needed actually to enforce the U.N. Biodiversity Conference's recent pledge to protect 30% of the planet's oceans, as well as its land, for conservation.

➢ Rise of commercial activities along the high sea having detrimental impact on its marine biodiversity and resources.

➢ Absence of organized authority for impact assessment, rules and regulation along the high sea.

➢ Nearly half the planet's surface covered by high seas which possess abundant marine biological resources; however absence of unified protection mechanism along the high sea these resources can be under threat.

➢ Although, marine resources of ocean under national boundaries have some protection but resources of high sea are prone to threat due to lack rules and regulation.

What percentage of our oceans is currently protected?

➢ As of 2022, approximately 8% of the world's ocean has been designated as marine protected areas (MPAs) which include 1.4 per cent of the high seas areas are protected.

➢ The high seas that are protected fall under North East Atlantic and Antarctic oceans.

➢ This number includes both fully and partially protected areas, with varying levels of protection and management measures.

➢ The United Nations has set a target of protecting at least 10% of the world's ocean by 2020 (under the Aichi Biodiversity Targets) and 30% by 2030 (under the 30 x 30 target of Convention on Biological Diversity).

➢ While progress has been made towards these goals, there is still a long way to go in terms of establishing effective and well-managed MPAs to conserve marine biodiversity and ecosystems.

Marine Biodiversity

Marine biodiversity refers to the variety of life forms exclusively within the ocean and other saltwater environments.

It encompasses the full range of ecosystems, from shallow coral reefs to deep-sea hydrothermal vents, and includes a vast array of species such as fish, marine mammals, invertebrates, plants, and microbes.

Marine biodiversity along National Boundaries and High Seas

Marine Biodiversity along National Boundaries

➢ National boundaries especially lie on continental shelf (a relatively shallow and flat area of seabed that surrounds the continents and forms the transition between the land and the deep ocean.)

➢ Since, continental shelf is shallow and flat area, it supports rich marine biodiversity.

➢ Most of the highly bio diverse marine ecosystem like coral reefs and mangroves supporting various range of marine species, including fish, invertebrates, and marine mammals are found along national boundaries.

Antimicrobial Resistance

An Emerging Global Health Threat that Needs Concerted Efforts

When microorganisms become resistant to antimicrobials, standard treatments are often ineffective, and in some cases, no drugs provide effective therapy. Consequently, treatments fail. This increases illness and mortality in humans, animals and plants.

■ **Sharmila Senthil Kumar**

According to UN Ad hoc Interagency Coordinating Group on Antimicrobial Resistance report – drug-resistant diseases could cause 10 million deaths each year by 2050 and damage to the economy as catastrophic as the 2008-2009 global financial crisis. By 2030, antimicrobial resistance (AMR) could force up to 24 million people into extreme poverty.

Currently, at least 700,000 people die each year due to drug-resistant diseases, including 230,000 people who die from multidrug-resistant tuberculosis. More and more common diseases, including respiratory tract infections, sexually transmitted infections and urinary tract infections, are untreatable; lifesaving medical procedures are becoming much riskier, and our food systems are increasingly precarious.

Thus, AMR has emerged as a major health concern across the globe and demands immediate concerted action. The World Health Organization (WHO) lists AMR among top 10 threats for global health.

What are antimicrobials?

Antimicrobials – including antibiotics, antivirals, antifungals and antiparasitics – are medicines used to prevent and treat infections in humans, animals and plants.

What is Antimicrobial Resistance?

Antimicrobial resistance (AMR) is the ability of microorganisms to persist or grow in the presence of drugs designed to inhibit or kill them. These drugs, called antimicrobials, are used to treat infectious diseases caused by microorganisms such as bacteria, fungi, viruses and protozoan parasites.

When microorganisms become resistant to antimicrobials, standard treatments are often ineffective, and in some cases, no drugs provide effective therapy. Consequently, treatments fail. This increases illness and mortality in humans, animals and plants.

For agriculture, this causes production losses, damages livelihoods and jeopardizes food security. Moreover, AMR can spread among different hosts and the environment, and antimicrobial resistant microorganisms can contaminate the food chain.

Why is antimicrobial resistance a global concern?

Antimicrobial resistance (AMR) is a major global threat of increasing concern to human and animal health. It also has implications for food safety, food security and the economic wellbeing of millions of farming households.

The emergence and spread of drug-resistant pathogens that have acquired new resistance mechanisms, leading to antimicrobial resistance, continues to threaten our ability to treat common infections.

Especially alarming is the rapid global spread of multi- and pan-resistant bacteria (also known as "superbugs") that cause infections that are not treatable with existing antimicrobial medicines such as antibiotics.

In 2019 WHO identified 32 antibiotics in clinical development that address the WHO list of priority pathogens, of which only six were classified as innovative. Furthermore, a lack of access to quality antimicrobials remains a major issue. Antibiotic shortages are affecting countries of all levels of development and especially in health-care systems.

Antibiotics are becoming increasingly ineffective as drug-resistance spreads globally leading to more difficult to treat infections and death. If people do not change the way antibiotics are used now, these new antibiotics will suffer the same fate as the current ones and become ineffective.

The cost of AMR to national economies and their health systems is significant as it affects productivity of patients or their caretakers through prolonged hospital stays and the need for more expensive and intensive care.

Without effective tools for the prevention and adequate treatment of drug-resistant infections and improved access to existing and new quality-assured antimicrobials, the number of people for whom treatment is failing or who die of infections will increase. Medical procedures, such as surgery, including caesarean sections or hip replacements, cancer chemotherapy, and organ transplantation, will become more risky.

Reasons for Antimicrobial Resistance

The use of antimicrobials in animal and plant production is influenced by the interplay of many factors:

➢ Burden of diseases that are otherwise preventable through modification of environmental hygiene, nutrition, husbandry and other management practices;

➢ Limited access to animal and plant health experts, as well as limitations in training and support for these experts;

Marine Spatial Planning Framework

On 14th February, 2023, Puducherry launched the country's first Marine Spatial Planning (MSP) framework.

About Framework

- The Framework was launched as part of a pact under the Indo-Norway Integrated Ocean Initiative, to balance growth alongside sustainable management of ocean resources and coastal environment preservation.
- Puducherry and Lakshadweep were chosen as coastlines to pilot the MSP initiative after a 2019 Memorandum of understanding (MoU) between India and Norway.
- **Implementation:** Ministry of Earth Sciences will oversees the implementation of the MSP through National Centre for Coastal Research (NCCR), the National Centre for Sustainable Coastal Management, the Puducherry Coastal Zone Management Authority and Department of Science, Technology and Environment, Puducherry in collaboration with Norwegian Environment Agency.
- In its primary phase, NCCR will develop a marine spatial planning framework for Puducherry and Lakshadweep.
- These sites have been chosen for the pilot project in view of their setups with unique opportunities for multiple sectors (such as industries, fisheries, and tourism) to flourish.

About Marine Spatial Planning (MSP)

- It is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve ecological, economic and social objectives that have been specified through a political process.
- Characteristics of marine spatial planning include ecosystem-based, area-based, integrated, adaptive, strategic and participatory.
- It aims to consider and integrate all uses and users of selected marine space, including retention of and improvement of ecological services provided by habitats, species and environment, so that coordinated management can be planned and implemented.

UNESCO's Definition of MSP

MSP has underlying and fundamental characteristics, which UNESCO defines as being:

- **Ecosystem-based:** balancing social, economic, environmental and governance goals and objectives toward sustainable development;
- **Integrated:** across sectors and agencies and among levels of government;
- **Place-based or Area-based:** defined by spatial boundaries;
- **Adaptive:** capable of learning from experience;
- **Strategic and Anticipatory**: focused on the long-term and future planning; and
- **Participatory:** with stakeholders actively involved in the process.

Need for MSP

- Development pressures in coastal waters for aquaculture, tourism, and renewable energy creates spatial conflicts, and there are challenges in both small scale and industrial fisheries to balance resource extraction with resource protection.
- Existing management systems are usually insufficient to address the complexity of issues facing the oceans today, or to integrate management across multiple sectors for the next 10-20 years.
- New management frameworks and governance structures are essential for ensuring that coastal communities and nations will continue to reap long-term benefits and services that healthy oceans can provide.
- To this end, marine spatial planning (MSP) provides governments, local communities, and marine sectors with a transparent, equitable, and participatory process to navigate these important challenges, develop effective and durable solutions, and plan for the future.

Polity & Governance

- Supreme Court Ruling on Appointment of CEC & ECs
- Corrupt Practices under RPA Act 1951
- Section 69(A) of Information Technology Act 2000

- Article 105 of Constitution: The Limits to Free Speech in Parliament
- Section 153A of IPC: Its Use and Misuse
- Special Category Status
- Income Tax Department's Survey vs. Search
- Greater Tipraland
- Issue of Missing Deputy Speaker
- President's Rule under Article 356
- Government sets up Panel on Digital Competition Law

Judiciary

- Neutral Citation System

Polity & Governance

Supreme Court Ruling on Appointment of CEC & ECs

On 2nd March, 2023, the Supreme Court (SC) made a ruling regarding the appointment of the Chief Election Commissioner (CEC) and Elections Commissioners (ECs) in India.

- The bench delivered its verdict on a batch of pleas seeking a collegium-like system for the appointment of Election Commissioners and the Chief Election Commissioner.
- Further, in November, 2022, the Court had noted that the appointment of Arun Goel as EC had been carried out with "lightning speed", with the procedure taking less than 24 hours on November 18 from start to finish.

About the Ruling

- The SC directed the Central Government to form a high-power panel consisting of the Prime Minister, Leader of Opposition in Lok Sabha and the Chief Justice of India.
- Appointment of ECs, CEC shall be done by the President on recommendation of this panel.

Current System for of CEC and ECs

- Part XV of the Indian Constitution deals with elections and provides for the establishment of the Election Commission of India.
- Articles 324-329 contained in the Constitution contain provisions relating to the powers, functions, tenure, eligibility etc. of the Commission and its members.
- The President makes the appointment on the advice of the Union Council of Ministers headed by the Prime Minister.
- They have tenure of 6 years, or up to the age of 65 years, whichever is earlier.
- They enjoy the same status and receive salary and perks as available to Judges of the Supreme Court of India.
- The Chief Election Commissioner can be removed from office only through impeachment by Parliament.

SUPREME COURT'S VERDICT ON ARTICLE 324

The Supreme Court in 'Mohinder Singh Gill & Anr vs The Chief Election Commissioner, New Delhi and Ors' (1977) held that Article 324 "operates in areas left unoccupied by legislation and the words 'superintendence, direction and control' as well as 'conduct of all elections' are the broadest terms".

- The Constitution has not defined these terms.
- The SC said Article 324 "is a plenary provision vesting the whole responsibility for national and State elections" in the ECI "and, therefore, the necessary powers to discharge that function".

Important Facts

- **EC Amendment Act, 1989:** Originally the Commission had only one Election Commissioner, but after the enactment of the Election Commissioners Amendment Act 1989, it has been made a multi-member body.
- **EC Act, 1991:** The Election Commission (Conditions of Service of Election Commissioners and Transaction of Business) Act, 1991 (EC Act) requires that the EC and CEC must hold the post for a period of six years. This law essentially governs the conditions of service of the CEC and ECs.
- **Goswami Committee:** In 1990, it recommended a change to the appointment process, suggesting that the CEC should be appointed by the President in consultation with the Chief Justice of India and the Leader of the Opposition in the Lok Sabha.
- **2nd ARC:** The Second Administrative Reforms Commission in its report in January 2007 recommended that a collegium headed by the Prime Minister and comprising the Lok Sabha Speaker, the Leader of the Opposition in the Lok Sabha, the Law Minister and the Deputy Chairperson of the Rajya Sabha be formed to make recommendations to the President regarding appointments of the CEC and ECs.

Social Justice
- Anubhuti Inclusive Park

Indian Society
- Right to be Forgotten

- Right against Self-incrimination

Social Issues
- Child Marriage
- NHRC Flags Implementation Gap in Mental Health-care Act 2017

Plans/Policies
- Pradhan Mantri Ayushman Bharat Infrastructure Mission
- Direct Benefit Transfer
- New Organ Transplantation Guidelines

Report
- Trends in Maternal Mortality from 2000 to 2020

Social Justice

Anubhuti Inclusive Park

On 20th February, 2023, Union Minister for Road Transport and Highways laid the foundation stone for the world's largest and unique Divyang Park - Anubhuti Inclusive Park, in Nagpur, Maharashtra.

- The park will have adapted facilities for all 21 types of disabilities like a touch and smell garden, hydrotherapy unit, water therapy, and independent room for mentally challenged children, and mother.
- The park is been established in consonance with the Rights of Persons with Disabilities Act, 2016.

About Rights of Persons with Disabilities Act, 2016

- The Act replaces the Persons with Disabilities (Equal Opportunities, Protection of Rights and Full Participation) Act, 1995.
- It fulfills the obligations to the United National Convention on the Rights of Persons with Disabilities (UNCRPD), to which India is a signatory.
- In the Act, disability has been defined based on an evolving and dynamic concept.
- The types of disabilities have been increased from existing 7 to 21 and the Central Government will have the power to add more types of disabilities.
- Persons with "benchmark disabilities" are defined as those certified to have at least 40 per cent of the disabilities specified above.
- The Act provides for grant of guardianship by District Court under which there will be joint decision – making between the guardian and the persons with disabilities.

UN Convention on Rights of Persons with Disabilities (UNCRPD)

- It was adopted on 13 December 2006 at the United Nations Headquarters in New York.
- It adopts a broad categorization of persons with disabilities and reaffirms that all persons with all types of disabilities must enjoy all human rights and fundamental freedoms.
- India is a signatory of UNCRPD. It ratified this Convention on 01-10-2007 in pursuance of Article 35 of the Convention.
- India submitted its First Country Report on Status of Disability in India in November 2015.

Important Facts

Sustainable Development Goals (SDGs) and Disability

- **Goal 4:** deals with inclusive and equitable quality education and promotion of life-long learning opportunities for the vulnerable, including persons with disabilities.
- **Goal 8:** to promote sustained, inclusive and sustainable economic growth and to achieve full and productive employment for persons with disabilities.
- **Goal 10:** strives to reduce inequality within and among countries by empowering and promoting the social, economic and political inclusion of all, including persons with disabilities.
- **Goal 11**: would work to make cities and human settlements inclusive, safe and sustainable by expanding public transport, with special attention to the needs of those in vulnerable situations, such as persons with disabilities.
- In addition, the proposal calls for providing universal access to safe, inclusive and accessible, green and public spaces, particularly for persons with disabilities.

Heritage
Art & Culture

Art & Culture

Musical Instruments and Folk Art of India

On 26th February, 2023, in his Mann ki Baat address, Prime Minister spoke of several musical instruments and folk art of India.

Sursingar
- It is a stringed instrument made of ivory and wood.
- This traditional instrument is found in various parts of North India.
- The strings of the instrument are usually four in number and made of brass or bronze, and are plucked with a metal pick.
- The Sursingar (along with the Rudra Veena and the Surbahar) usually accompanies Dhrupad, the genre of Hindustani vocal music which has a low, deep, and thoughtful pitch.
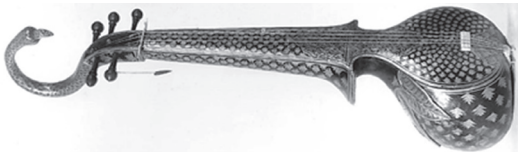
Mandolin
- A mandolin is a stringed musical instrument in the lute family and is generally plucked with a pick.
- It evolved in the 18th century in Italy and Germany from the 16th-century mandora.
- The Mandolin is a moderately sized instrument, smaller than the Veena, Sitar, or guitar, and was developed in Europe in the 18th century as an evolution of the older Mandora (Mandola).
- The instrument's modern form and proportions were strongly influenced by its maker Pasquale Vinaccia of Naples (1806-82).
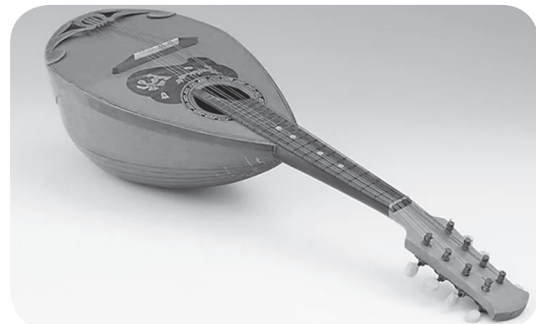
Karakattam Folk Dance
- Karakaattam is an ancient folk dance of Tamil Nadu performed in praise of the rain goddess Mariamman.
- Traditionally, this dance is categorized into two types:
  i) **Aatta Karakam** symbolizes joy and happiness. It is mainly performed as entertainment.
  ii) **Sakthi Karakam** is performed only in temples as a spiritual offering.
- It involves three tiers of flower arrangements of different colours sitting on top of a container filled to the brim with water, rice, or soil.
- Other highlights include blowing fire, inserting needles into eyes, and keeping balance while holding a bottle parallel to the ground on the performer's back.

Lavani Folk Art

Recently, a younger generation of women dancers is accused of vulgarising Lavani, the traditional folk art form with their allegedly risque dressing and sexually suggestive moves.

About Lavani
- It is a genre of music popular in Maharashtra, India.
- Lavani dance was generally performed by Dhangars or Shepherd living in the Solapur, Maharashtra.
- Essentially, it is performed by females wearing a nauvari saree (nine-yard long saree).

ECONOMY WATCH

Agriculture

Three National Flagship Programs launched at ICAR-CIBA

On 28th February, 2023, the Ministry of Fisheries, Animal Husbandry & Dairying launched three national flagship programs at Indian Council of Agricultural Research-Central Institute of Brackishwater Aquaculture (ICAR-CIBA), Chennai.

1. **National Surveillance Program for Aquatic Animal Diseases (NSPAAD) Phase-II**

Need: Early detection and managing the spread of diseases among the reared aquatic fauna is crucial for sustaining income and export feasibility. Diseases cost around 7200 crores per year.

Objective: To ensure that disease cases are reported immediately, investigated, and farmers receive scientific assistance.

Implementation
- NSPAAD Phase-II under the Pradhan Mantri Matsya Sampada Yojana (PMSSY) will be implemented across India, with the help of all the state fisheries departments and Marine Products Export Development Authority (MPEDA).
- NSPAAD Phase-I was launched in 2013, with a focus on strengthening the farmer-based disease surveillance system.

2. **Genetic Improvement Program of Indian White Shrimp-Phase-I**

Need: Farmed shrimp accounts for approximately 70% of India's seafood exports. However, the sector mostly depends on one exotic Specific Pathogen Free stock of Pacific white shrimp (*Penaeus vannamei*).
- Hedging of risk is necessary in a sector that depends on only one species for the production of 10 lakh tonnes of shrimps and involves huge investments on farming infrastructure.

- It also jeopardizes the livelihoods of two lakh farm families directly and around ten lakh families indirectly associated with the ancillary sectors.

Objective: Genetic improvement program of Indian white shrimp, *Penaeus indicus*, by ICAR-CIBA will be done to break over-dependence on single species and promote indigenous species.

Implementation
- The Department of Fisheries has sanctioned Rs. 25 crores under the PMMSY for the scheme, to establish a National Genetic Improvement Facility for shrimp breeding.
- It will break single species dependence and to promote indigenous species vis-à-vis exotic shrimp species.

3. **Shrimp Crop Insurance**

Need: Poor penetration of banking and insurance institutions in the Shrimp Farming industry, as it is labelled as a risky venture.
- Lack of access to institutional credit to small aquaculture farmers who own 2–3 ponds and face huge obstacles to raising working capital for the crop.

Objective: To establish farmers' access to insurance and institutional credit, facilitated by an insurance scheme that will help them double their income.

Implementation
- ICAR-CIBA has estimated Rs 1000 to Rs 1500 crores as the business potential of shrimp crop insurance per year and a microcredit requirement of over Rs 8,000 to 10,000 crores per annum, which is now being serviced by informal creditors at higher interest rates.

Important Facts
- Indian Council of Agricultural Research (ICAR), New Delhi, under the Ministry of Agriculture, Government of India established the Central Institute of Brackish water Aquaculture (CIBA) on April 1st, 1987.

SCIENCE & TECHNOLOGY

- JWST Spots Six Monster Galaxies
- NISAR Mission
- New Evidence of Ancient Lake on Mars

New Technology & Innovations
- First Flue Gas Desulphurization Plant in South India
- Indole-based Novel Molecule as Preventive against COVID Variants

Earth Sciences
- Earth's Innermost Realm

News Snippets

Space Science
- SSLV-D2/EOS-07 Mission
- Chandrayaan-3 Lander Completes EMI-EMC Test

Space Science

SSLV-D2/EOS-07 Mission

On 10th February, 2023, the Indian Space Research Organisation (ISRO) successfully launched its second developmental flight of a Small Satellite Launch Vehicle, SSLV-D2. It placed three satellites in its precise orbit.

- SSLV-D2 was launched from the Satish Dhawan Space Centre-SHAR, Sriharikota.
- The first developmental flight of SSLV, launched on August 7, 2022, ended up to be a partial failure, as the rocket failed to inject its satellite payload in their intended orbits.

Key Points
- **Mission Objectives:** To demonstrate in-flight performance of SSLV vehicle systems and launch the three satellites into intended orbit.
- **The Satellites:** The three satellites are ISRO's Earth Observation Satellite – EOS-07, US-based firm Antaris' Janus-1 and Chennai-based space start-up SpaceKidz's AzaadiSAT-2.
- SSLV-D2 injected satellites into close to 450 km circular orbit at an inclination of 37.2 degrees.
- **EOS 07:** EOS-07 is 156.3 kg satellite designed, developed and realized by ISRO.
- An earth observation satellite, EOS-07's new experiments include mm-Wave Humidity Sounder and Spectrum Monitoring Payload.
- **Janus-1:** It is a technology demonstrator satellite built by United States-based Antaris and its Indian partners XDLinks and Ananth Technologies.
- Janus-1, weighing only 10.2 kg and built in 10 months, is a six-unit cube satellite with five payloads on board.
- **AzaadiSat2:** It is a Cubesat weighing around 8.7 kg and carries 75 different payloads.
- It is a combined effort of about 750 girl students across India guided by SpaceKidz India, Chennai.

SSLV: Important facts
- Small Satellite Launch Vehicle (SSLV) of ISRO is designed to be affordable and amenable to industry production and will function as a launch-on-demand platform for Mini, Micro or Nano satellites (up to 500 kg satellites) to Low Earth Orbits.
- It is a three-stage vehicle with all solid propulsion stages and liquid propulsion-based Velocity Trimming Module (VTM) as the terminal stage.
- The launcher also targets many novel features including low turn-around time, flexibility in accommodating multiple satellites, launch-on-demand, minimal launch infrastructure requirements, etc.

Chandrayaan-3 Lander Completes EMI-EMC Test

The Chandrayaan-3 lander has successfully completed the crucial EMI-EMC (Electro - Magnetic Interference/ Electro - Magnetic Compatibility) test at the U R Rao Satellite Centre in Bengaluru.

The EMI-EMC test is conducted for satellite missions to ensure the functionality of the satellite subsystems in the space environment and their compatibility with the expected electromagnetic levels.

About Chandrayaan-3 Mission
- Chandrayaan-3 is India's follow-on mission to Chandrayaan-2 to demonstrate end-to-end capability in safe landing and roving on the lunar surface.
- The mission is expected to be launched later this year by Launch Vehicle Mark 3 from the Satish Dhawan Space Centre at Sriharikota, Andhra Pradesh.
- **Objectives:** The mission objectives of Chandrayaan-3 are:
  - To demonstrate safe and soft landing on lunar surface;
  - To demonstrate Rover roving on the moon; and
  - To conduct in-situ scientific experiments.

ECOLOGY & ENVIRONMENT

Climate Change
- Glacial Lake Outburst Floods
- Feedback Loops Worsening Climate Crisis

Biodiversity
- Poaching and Trafficking of Pangolins in India

Sustainable Development
- GSI Discovers Lithium in Jammu and Kashmir
- Gross Domestic Climate Risk Report

Report
- IEA Report Flags Rising Methane Emissions

News Snippets

Climate Change

Glacial Lake Outburst Floods

According to a recently published study, lives of millions across the globe are threatened due to glacial lake outburst floods (GLOFs). It is the first global assessment of areas vulnerable to GLOFs.

Key Findings

- **Extreme Vulnerability:** Around 15 million people across the world face the risk of sudden and deadly flooding from glacial lakes, which are expanding and rising in numbers due to global warming.
- Those facing the greatest threat live in mountainous countries in Asia and South America. More than half of those who could be impacted live in four countries: India, Pakistan, Peru and China.
- Globally, 90 million people across 30 countries live in 1,089 basins containing glacial lakes. Of these, 15 million (16.6 per cent) live within 50 kilometres of a glacial lake.
- The population exposed to GLOFs increases with distance from a glacial lake. Almost half (48 per cent) of exposed populations are globally located between 20 km and 35 km downstream of lakes.
- **High Mountain Asia:** The majority of the globally exposed population amounting to 9.3 million (62 per cent) are located in the region of high mountain Asia (HMA).
- Populations in HMA live, on average, closer to glacial lakes than anywhere else, with "one million people living within 10 km downstream of a glacial lake, where any early warning time is likely to be low, and, uncertainty in GLOF magnitude high.
- **Indian Scenario:** Three million Indians live in areas where a glacial lake outburst flood (GLOF) can happen at any time. Together with two million Pakistanis, they form a third of the total number of people worldwide facing such a risk.
- **Most Dangerous Basins:** The most dangerous of Glacial basins are found in Pakistan (Khyber Pakhtunkhwa basin),

Peru (Santa basin) and Bolivia (Beni basin) containing 1.2 million, 0.9 million and 0.1 million people respectively who could be exposed to GLOF impacts.
- Glaciers across the Andes have undergone rapid deglaciation over the last 20 years in response to climate changes.
- **Sudden Outbursts:** The rapid onset and high discharge of GLOFs means there is often insufficient time to effectively warn downstream populations and for effective action to be taken, particularly for populations located within 10-15 km of the source lake.
- **Suggestions:** Improvements are urgently needed in designing early warning systems alongside evacuation drills and other forms of community outreach to enable more rapid warnings and emergency action in these highly exposed areas.
- Limiting climate change and keeping warming under 1.5 degree Celsius is a crucial imperative as this will help slow the growth of glacial lakes, but unfortunately a certain amount of ice loss is already 'locked in'.

GLACIAL LAKE OUTBURST FLOOD
- Glacial lakes are large bodies of water that sit in front of, on top of, or beneath a melting glacier. As they grow larger in size, they become more dangerous because glacial lakes are mostly dammed by unstable ice or sediment composed of loose rock and debris.
- In case the boundary around them breaks, huge amounts of water rush down the side of the mountains, which could cause flooding in the downstream areas. This is called glacial lake outburst flood or GLOF.
- These floods can be triggered by a number of factors, including changes in the volume of the glacier, changes in the water level of the lake, and earthquakes.

Feedback Loops Worsening Climate Crisis

A recently released report has highlighted the significant role of climate feedback loops in worsening the climate crisis.

The report, researchers believe, contains the most comprehensive list of feedback loops ever compiled.

WORLD WATCH

International Relations

India and Germany to Enhance Cooperation

On 25th February, 2023, during the visit of German Chancellor, India and Germany agreed on a vision statement to enhance cooperation on innovation and technology. Also, both countries agreed to further strengthen cooperation in various other areas.

Key Highlights

Vision Document
- The Vision Document focuses on deepening ties between industry and spurring cooperation on development of advanced technologies like Artificial Intelligence and 6G.
- Guided by both countries' shared democratic values and respect of universal human rights, this cooperation aims at benefiting humanity.
- The statement issued at the end of the meeting mentioned that the two countries share a long history of cooperation in science and technology, research and innovation, institutionalised under the framework of the Inter-Governmental Agreement on 'Cooperation in Scientific Research and Technological Development', signed in May 1974.

Digital Technologies
- India and Germany acknowledged that digital technologies and solutions could address key development needs and highlighted the potential of these digital solutions to achieve Sustainable Development Goals (SDGs) in other parts of the developing world.

Green and Sustainable Development Partnership
- Both countries discussed progress on Green and Sustainable Development Partnership (GSDP), which India and Germany had launched during visit of the Indian Prime Minister to Berlin for the 6th Inter-Governmental Consultations (IGC).
- The GSDP is an umbrella partnership that provides political guidance and steer to robust ties in climate action and SDGs.
- Under this, Germany will also place €10 billion in new and additional commitments under their development cooperation portfolio in India.

Green Hydrogen
- India and Germany signed a letter of intent for cooperation on Green Hydrogen.
- During the IGC, India and Germany had agreed to cooperate on Green Hydrogen.
- The Indo-German Green Hydrogen Task Force was constituted in September 2022 and an Action Plan is close to finalisation.

Triangular Development Cooperation
- During the sixth IGC, India and Germany had agreed to work on development projects in third world countries.
- The four projects, announced in May 2022, are now in advanced stages of implementation:
  - ✓ **Cameroon:** Potato Seed Production through Rooted Apical Cuttings (RAC) Technology.
  - ✓ **Malawi:** Agri Business Incubator Models for Women in Agriculture & Food Systems.
  - ✓ **Ghana:** Developing Bamboo-Based Enterprises for Sustainable Livelihood and Income Generation in Ghana.
  - ✓ **Peru:** Development of a geospatial portal prototype for planning, monitoring, and evaluation of the Ministry of Development and Social Inclusion of Peru (MIDIS) interventions and social programs.

Regional Challenges
- Both countries discussed the regional context in the global situation.
- They agreed to look at how they can cooperate to mitigate existing challenges and harness opportunities which exist in space and defence cooperation.

STATE WATCH

Assam

North East's First Compressed Biogas Plant

- The first-ever compressed biogas plant project in northeast will be set up at Domora Pathar in Sonapur under the Kamrup (Metropolitan) district.
- The plant, which is being built under the name Redlemon Technologies, is expected to begin operating in November 2023 and will have a 5 tonne-per-day production capacity for compressed biogas from raw materials like municipal solid wastes and cattle manure.

Kerala

First Indian State to Use Robotic Scavengers

- The Kerala government has launched robotic scavenger, "Bandicoot", to clean sewages in the temple town of Guruvayur, becoming the first state in the country to use robotic technology to clean all its commissioned manholes.
- Bandicoot, developed by Kerala-based Genrobotics, had recently bagged 'Kerala Pride' award at the Huddle Global 2022 conclave organised by Kerala Startup Mission (KSUM).

First Indian High Court to Publish Judgment in Regional Language

- On February 21, 2023, also known as International Mother Language Day, the Kerala High Court published two of its most recent decisions in Malayalam, making it the first high court in the nation to do so.
- On the court's website, the Malayalam decisions were posted right underneath the English version.
- The news comes a day after the Supreme Court began testing a live transcription service to record its hearings and then translate them into text using artificial intelligence (AI) and NLP-based technology.
- The facility was used in Chief Justice of India D Y Chandrachud's courtroom, when he presided over a Constitution bench hearing the Maharashtra constitutional crisis.
- In order to translate rulings from English to regional languages, the Supreme Court established an artificial intelligence team to create the SUVAS (Supreme Court Vidhik Anuwad Software), an open-source judicial domain language translation tool.

Pact with UN Women

- The Kerala government and UN Women entered into an agreement, in order to promote activities that are welcoming to women in the State's tourist industry.
- In addition to offering advice for baseline research, implementing women-friendly tourist destinations, and supporting interventions to change pervasive discriminatory social norms, this will be accomplished by creating modules and building the capacity of relevant stakeholders.

Odisha

India's First Agri Chatbot 'Ama KrushAI' Launched in Odisha

- Governor of Odisha launched India's first AI Chatbot for the Agricultural sector 'Ama KrushAI' at the valedictory session of 'Krushi Odisha 2023'.
- 'Ama KrushAI' chatbot will help the farmers with the best agronomic practices, inform them about government schemes, and loan products from more than 40 commercial and cooperative banks.

PRELIMS 2023 SPECIAL-6

Geography of India

Exam-centric, statements-based, to the point content with recent developments and important facts & figures

In this **Prelims 2023 Special-6** we have covered Indian Geography. In the Civil Services Preliminary Examination, in General Studies Paper-I, a lot of questions are asked from Geography of India.

Analysing the questions asked during past 3 years:

- *We found that most of the Geography questions pertain to the Geography of India, some sections of which are very dynamic in nature.*
- *The questions are inter-disciplinary, multi-disciplinary and based on current affairs with geographical underpinnings.*
- *It is generally observed that updated facts and figures related to these segments, due to their dynamic nature, are not easily available to the aspirants. Even the standard books lack updated data, facts and figures.*

Keeping this in mind, in this Prelims 2023 Special-6:

- *We have presented contemporary topics-based content on these dynamic segments of the Geography of India.*
- *We have divided the entire content into nine chapters based on topics from which most of the questions are asked.*
- *We have incorporated the geographical and historical aspects, important facts, recent developments, and institutional framework related to each topic for comprehensive coverage.*

We hope you find this material helpful in your preparation for General Studies Paper-I of the Preliminary Examination.

*We encourage you to send us your **feedback at cscenglish@chronicleindia.in***

Happy reading!

Agriculture

Irrigation

Evolution of Irrigation System

- **Indus Valley Civilization:** Indus Valley Civilization protected their crops with slings and clays of balls. They also built walls to protect them from floods. They used irrigation canals to bring water from the river to their crops.

- **Ancient India:** The Veda mentions only well-style irrigation, where kupa and avata wells once dug are stated to be always full of water. Later, in the 4th-century BCE Indian scholar Pāṇini, mentions tapping rivers (Sindhu, Suvastu, Varnu, Sarayu, Vipas and Chandrabhaga) for irrigation.

- **Medieval India:** The most widespread irrigation system in India was undertaken in India in the medieval period by the Sultanate rulers. **Firoz Shah Tughlaq (1309-1388) built the most extensive canal irrigation system around the Indo-Gangetic doab** and the region west of the river Yamuna in the fourteenth century.

- **Colonial Era: Ganges irrigation canal** built during the colonial era, and **inaugurated in 1854**. The Britishers by 1940 built significant number of canals and irrigation systems in Uttar Pradesh, Bihar, Punjab, Assam and Odisha.

Types of Irrigation System in India

- **Well and Tube Well Irrigation:** Wells are mainly found in U.P., Bihar, Tamil Nadu, etc. There are various types of wells – shallow wells, deep wells, tube wells, artesian wells, etc. Tube wells are mostly used in U.P., Haryana, Punjab, Bihar and Gujarat.

- **Canal Irrigation:** Canals can be an effective source of irrigation in areas of low-level relief, deep fertile soils, perennial source of water and extensive command area.

- Therefore, the main concentration of canal irrigation is in the northern plain of India, especially the areas comprising Uttar Pradesh, Haryana and Punjab.

- **Tank Irrigation:** A tank is developed by constructing a small bund of earth or stones built across a stream. The water impounded by the bund is used for irrigation and other purposes.

- Tank comprises an important source of irrigation in the Karnataka Plateau, MP, Maharashtra, Odisha, Kerala Bundelkhand area of UP, Rajasthan and Gujarat.

- **Drip Irrigation:** In drip irrigation, water is applied near the plant root through emitters or drippers, on or below the soil surface, at a low rate varying from 2-20 litres per hour. The soil moisture is kept at an optimum level with frequent irrigations.

- **Sprinkler Irrigation:** In this method, water is sprayed into the air and allowed to fall on the ground surface somewhat resembling rainfall. The spray is developed by the flow of water under pressure through small orifices or nozzles.

- The sprinkler irrigation system is a very suitable method for irrigation on uneven lands and on shallow soils.

- **Furrow Irrigation:** Furrow irrigation is a type of surface irrigation in which trenches or "furrows" are dug between crop rows in a field. Farmers flow water down the furrows and it seeps vertically and horizontally to refill the soil reservoir. Flow to each furrow is individually controlled.

- **Surge Irrigation:** Surge irrigation is a variant of furrow irrigation where the water supply is pulsed on and off in planned time periods. The wetting and drying cycles reduce infiltration rates resulting in faster advance rates and higher uniformities than continuous flow.

- **Ditch Irrigation:** It is a rather traditional method, where ditches are dug out and seedlings are planted in rows. The plantings are watered by placing canals or furrows in between the rows of plants. Siphon tubes are used to move the water from the main ditch to the canals.

- **Sub Irrigation or Seepage Irrigation:** It is a method of irrigation where water is delivered to the plant root zone from below the soil surface and absorbed upwards. The excess may be collected for reuse.

Important Facts

- Out of about 141 million hectare of net area sown in the country, about 65 million hectare (or **45 percent) is presently covered under irrigation**.

- **State-wise Irrigation:** Punjab (98.6%); Haryana (91.4%); Uttar Pradesh (79.7%); Bihar (69.3%); and West Bengal (64%).

- **Crop-wise Coverage:** Sugarcane (95.5%); Wheat (94.5%); Rapeseed and Mustard (79.2%); Barley (79.1%); Tobacco (65.1%); and Rice (60.6%).

- **Area under Micro-Irrigation:** Total area under Micro-irrigation is 12.90 million ha (19.8% of total area under cultivation). Out of which, Drip Irrigation (6.11 million ha); Sprinkler Irrigation (6.79 million ha).

Institutional Framework

- The Union Government has constituted the **Central Ground Water Authority (CGWA)** on 14th January 1997 under Section 3(3) of Environment (Protection) Act, 1996 with **objective to regulate and control development and management of ground water** with jurisdiction in whole of the country.