Martial Art Final

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MARTIAL ART

Martial arts are traditional combat systems practiced for various purposes such as physical, mental, spiritual growth and self defence.

Huyen Langlon (Manipur)

- **Meaning:** Huyen (War) Langlon (Knowledge)
- **Components:** Thang-Ta (Armed Combat) and Sarit Sarak (Unarmed Fighting)
- **Weapons:** Thang (Sword) and Ta (Spear)

Lathi Khela (West Bengal)

- **Lathial:** Practitioner of Lathi Khela
- **Weapon:** Lathi (One of the world's oldest weapons)

Gatka (Punjab)

- Toned-down version of the deadlier **Shastar Vidya.**
  - Sharp swords (Shastar Vidya) replaced by Wooden Sticks and Shield (Gataka)
- **Role of Sikh Gurus:** 6th Sikh Guru Hargobind adopted it through 'Kirpan' for Self-Defense.
  - 10th Guru Gobind Singh made it compulsory for everyone
- **Weapons:** Sword and Sticks
- **Establishment of Gatka Federation of India:** 2018

Kalaripayattu (Kerala)

- **Feature:** This art form includes mock dules (armed and unarmed combat) and physical exercises.
  - Focuses on footwork
- **Kalari (Battlefield):** Place where this martial art is practiced
- **Weapon:** Strikes, Kicks

Mallakhamb (Madhya Pradesh & Maharashtra)

- **Feature:** A gymnast performs aerial yoga with a vertical wooden pole
- **Meaning:** Malla (Wrestler) Khamb (Pole)
- **Origin:** Indian subcontinent

Silambam (Tamil Nadu)

- Allows the use of a broad range of weapons
  - **Feature:** Incorporates tactics of animal motions (snake, tiger, and eagle)
  - **Created By:** Lord Muruga [Son of Lord Shiva (Kartekeya) and Sage Agasthya]
  - **Spread:** Tamil Nadu to Malaysia

Kathi Samu (Andhra Pradesh)

- **Weapons:** Various kinds of Swords
- **Garidi:** Location where Kathi Samu is performed
- **Stick Fight (Vairi):** Plays a significant part as a precursor to the real sword fight.

Paika Akhadha (Odisha)

- **Meaning:** Warrior School
- **Physical Activity:** Rhythmic gestures and weapons swung on the beat of the drum.

Pari Khanda (Bihar)

- This martial art forms the basis of Chhau dance (UNESCO's Intangible Cultural Heritage of Humanity)
  - **Meaning:** Pari (Shield) Khanda (Sword)
  - **Created By:** Rajput
  - **Weapons:** Sword and Shield

Thoda (Himachal Pradesh)

- Mixture of martial art, sport and culture
  - **Focus:** Skill of archery
  - **Performed on:** Baisakhi (13th and 14th April)
  - **Weapons:** Bows and Arrows
  - **Included Teams:** Pashis (Pandavas) Saathis (Kauravas)

NOTE

- Various **Indian martial arts** are now part of the routine training of regiments of the Army.
- The **Ministry of Youth Affairs and Sports** inducted 4 indigenous martial art forms- **Kalaripayattu, Mallakhamb, Gatka** and **Thang-ta** into the **Khelo India Youth Games (KIYG).**

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Interplay of Heat Waves, Anticyclones and Global Warming

For Prelims: El Niño, India Meteorological Department, Heatwave, Climate change, Greenhouse Gases (GHG).

For Mains: Global warming and the heat waves, Early warning systems, Impact of anticyclones on Indian weather patterns

Source: TH

Why in News?

As the world grapples with the **waning phase of the strong** El Niño of 2023, the India Meteorological Department has warned of severe heatwave **conditions affecting extensive areas of eastern India and the** Gangetic Plain.

- This highlights the challenge of understanding how global warming affects local weather. Additionally, the presence of **anticyclones** further complicates the situation, exacerbating the severity of heat waves in affected areas.

What Role Do Heat Waves Play in Global Warming?

- Heat waves result from climate change, caused by the burning of fossil fuels that add Greenhouse Gases (GHG) to the atmosphere.
    - These **gasses trap more heat energy,** increasing average and extreme temperatures.
- GHG emissions from human activities have heated the planet by about 1.2 degrees Celsius since pre-industrial times.
    - That warmer baseline means higher temperatures can be reached during extreme heat events.
- Global warming causes **uneven temperature changes across regions,** leading to **local variations in heat waves.**
    - Despite some areas experiencing cooler temperatures, **global warming can create conditions that intensify heat waves locally**, influenced by land use and geography.
- Understanding these local effects is important for accurate forecasting and effective heat wave mitigation.

What is an Anticyclone?

- **High-Pressure Systems**: Anticyclones are areas of high atmospheric pressure, the opposite of cyclones (low pressure).
- **Wind Circulation**: Winds blow **clockwise** around an anticyclone in the Northern Hemisphere and **counterclockwise** in the Southern Hemisphere due to Earth's rotation (Coriolis Effect).
- **Clear Skies and Calm Weather:** Anticyclones bring stable, calm conditions with little wind and clear skies.
- **Dry Air:** Sinking air in anticyclones warms up and dries out, leading to less rain and humidity.
- **Summer vs. Winter Effects:** Summer anticyclones can be hot and sunny, while winter anticyclones can be cold and clear with morning frost.

CYCLONE

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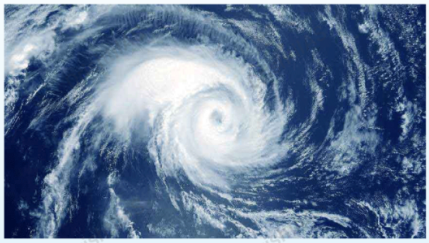
Cyclones are rapid **inward** air circulation around a **low-pressure** area.

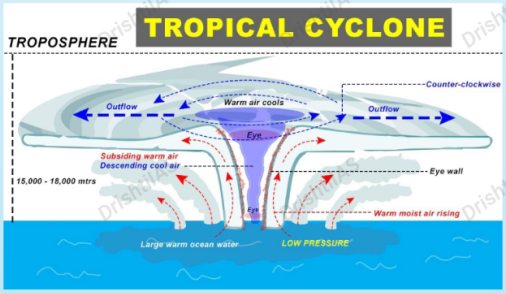


Cyclone v/s Anticyclone

Pressure System	Pressure Condition at the Center	Pattern of Wind Direction	
		Northern Hemisphere	Southern Hemisphere
Cyclone	Low	Anticlockwise	Clockwise
Anticyclone	High	Clockwise	Anticlockwise

Classification

- **Tropical Cyclones;** originate between the **Tropics of Capricorn and Cancer**
- **Extra Tropical/ Temperate Cyclones;** originate in the **Polar Regions**



Conditions for Formation

- Large sea surface with temperature >27° C.
- Presence of the **Coriolis force**
- Small **variations in the vertical wind speed**
- **A pre-existing weak low- pressure area**
- **Upper divergence** above the sea level system

Nomenclature

- Nodal Authority - **World Meteorological Organization (WMO)**
- Indian Ocean Region - **Bangladesh, India, Maldives, Myanmar, Oman, Pakistan, Sri Lanka** and **Thailand** contribute to naming cyclones that occur in this region.

Different Names for Tropical Cyclones

- **Typhoons** - Southeast Asia and China
- **Hurricanes** - North Atlantic and eastern Pacific
- **Tornados** - West Africa and southern USA
- **Willy-willies** - Northwest Australia
- **Tropical Cyclones** - Southwest Pacific and Indian Ocean

Cyclones in India

- **Bi-annual Cyclone Season** - March to May and October to December
- Recent Cyclones - **Tauktae, Vayu, Nisarga and Mekanu** (in Arabian Sea) and **Asani, Amphan, Fani, Nivar, Bulbul, Titli, Yaas and Sitrang (in Bay of Bengal)**

What Links Anticyclones to Heat?

- **Anticyclones and Heat:**
  - Anticyclones are linked to heat through their **persistence and strength.**
  - During the pre-monsoon season, the **Indian Easterly Jet (IEJ)** and a **strong westerly jet** can generate an anticyclonic pattern over the Indian Ocean and the Indian subcontinent.
    - A strong anticyclone can bring dry and hot weather over many parts of India, while a **weak anticyclone produces milder weather.**

        - IEJ is a narrow belt of strong easterly winds in the mid-troposphere that blows over peninsular India and the adjoining south Indian Ocean during the **pre-monsoon season (March-May).**
            - It is weaker and smaller than the well-known **African Easterly Jet (AEJ).**
            - AEJ occurs in the **lower troposphere over West Africa.** It is characterized by easterly winds and is most prominent during the summer months.
            - It is formed due to the temperature contrast between the hot Sahara Desert and the cooler Gulf of Guinea.
- **Impact of Anticyclones on Weather Patterns:**
    - Strong IEJ years lead to **higher near-surface temperatures** and drier conditions in India, while weak IEJ years result in cooler and wetter conditions.
    - The strength of the anticyclone in a particular year is a key factor in determining whether it is related to heat waves and global warming.
        - The impact of **El Niño on the Indian subcontinent** tends to **produce stronger and more persistent anticyclones,** leading to longer-lasting and more intense heat waves.
    - Understanding the background state of cool seasonal temperatures and strong, persistent anticyclones is essential for **accurate weather predictions and early warnings.**
- **Recent Impact of Anticyclones**:
    - The recent **anticyclonic circulations over the North Indian Ocean** were responsible for **abnormal rainfall in Odisha in March 2024.** Anticyclones, characterized by clockwise winds and sinking air, can create **high-pressure** heat domes.
        - This phenomenon may have also contributed to floods in Dubai in April 2024.

Early Warning Systems

- Accurate early-warning systems for global warming use a **three-step approach called the 'ready-set-go' system.**
- The approach is part of the '**Subseasonal-to-Seasonal Predictions (S2S)' project** of the **World Climate Research Program** under the World Meteorological Organisation.
    - **India is part of this project** and has invested heavily in S2S predictions.
- The three-step approach is important for guiding the National Disaster Management Agency (NDMA) to function efficiently and effectively.
    - The 'ready' step provides a **seasonal outlook based on external factors** such as global warming and El Niño.
    - The 'set' step involves sub seasonal **predictions for weeks two to four**, contributing to resource allocations and identifying potential hotspots.
    - The 'go' step is based on **short- and medium-range forecasts** and involves managing disaster response efforts.
- However, the challenge lies in **enhancing local-level weather predictions**. Efforts are underway to forecast weather trajectories over a 10-year span.
    - Coordination and early warning mechanisms are being developed at different levels, requiring training and engagement of governments, departments, and the public.
- The success of these systems is crucial for India's sustained economic development.

Drishti Mains Question:

Q. Explain how anticyclones exacerbate heat wave conditions and contribute to the complexity of weather patterns, particularly in the context of the Indian subcontinent.

Read more...

UPSC Civil Services Examination Previous Year's Questions (PYQs)

Prelims:

Q. Consider the following statements: (2020)

1. Jet streams occur in the Northern Hemisphere only.
2. Only some cyclones develop an eye.
3. The temperature inside the eye of a cyclone is nearly 10ºC lesser than that of the surroundings.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 and 3 only
(c) 2 only
(d) 1 and 3 only

Ans: (c)

Exp:

- Jet Stream is a geostrophic wind blowing horizontally through the upper layers of the troposphere, generally from west to east, at an altitude of 20,000 - 50,000 feet.
- Jet Streams develop where air masses of different temperatures meet. So, usually surface temperatures determine where the Jet Stream will form.
- Greater the difference in temperature, faster is the wind velocity inside the jet stream. Jet Streams extend from 20° latitude to the poles in both hemispheres. **Hence, statement 1 is not correct.**
- Cyclones are of two types, tropical cyclone and temperate cyclone. The center of a tropical cyclone is known as the 'eye', where the wind is calm at the center with no rainfall.
- However, in a temperate cyclone, there is not a single place where winds and rains are inactive, so the eye is not found. **Hence, statement 2 is correct.**
- The eye of a tropical cyclone is warmer, not colder, and it is this warmer temperature that drives the storm. **Hence, statement 3 is not correct.**

Mains

Q. Tropical cyclones are largely confined to the South China Sea, Bay of Bengal and Gulf of Mexico. Why? **(2014)**

Constructed Wetlands

For Prelims: Benefits of constructed **wetlands**, Types of constructed wetlands, Wetlands, Central Pollution Control Board (CPCB)

For Mains: How constructed wetlands can help India's water crisis, Using constructed wetlands for sustainable development India

Source: DTE

Why in News?

- Recently, there has been a **shift towards constructed wetlands**, which are a more comprehensive and nature-based solution for industrial wastewater treatment, as compared to traditional methods that have **proven inadequate in addressing the array of pollutants present.**

What are Constructed Wetlands?

- **About:**
  - Constructed wetlands are **engineered systems** designed to replicate the natural processes of wetlands **for wastewater treatment.**
  - They consist of carefully selected vegetation, soil, and water that work together to purify wastewater.
  - These wetlands are specifically designed to **promote** the **growth of beneficial** microorganisms and plants that can break down pollutants and improve water quality.
- **Types of Constructed Wetlands**
  - **Subsurface Flow (SSF):** SSF wetlands involve passing wastewater through **gravel beds or porous media**, where microbial activity degrades organic matter.
  - **Surface Flow (SF):** SF wetlands have **water flowing above the surface,** often creating aesthetically pleasing landscapes with diverse vegetation.
- **Benefits of Constructed Wetlands:**
  - **Need:** Traditional treatment methods, such as **physical and chemical treatments**, often struggle to effectively treat the complex mix of pollutants found in industrial wastewater.
    - These methods can be **costly, energy-intensive,** and may not completely remove all contaminants. There comes the role of more comprehensive and sustainable solutions like constructed wetlands.
  - **Environmental Benefits:** They can serve as **habitats for a variety of plant** and animal species, contributing to **biodiversity conservation.**
    - Moreover, they can provide ecosystem services such as flood control and carbon sequestration, enhancing their ecological significance and value.
    - Constructed wetlands are also a **sustainable solution** for water treatment. They require minimal energy and utilize natural processes for purification.
  - **Cost-Effective:** Compared to traditional wastewater treatment plants, constructed wetlands are **less expensive** to build, operate, and maintain.
  - **Nutrient Removal:** They are **efficient in removing pollutants** like nitrogen, phosphorus, and organic matter.
  - **Land Reclamation:** These systems can be used to **reclaim land degraded** by mining activities by **restoring** natural wetland functions.
- **Applications of Constructed Wetlands:**
  - **Municipal Wastewater Treatment:** Constructed wetlands can be a secondary or tertiary treatment stage **for municipal wastewater,** improving water quality before discharge or reuse.
  - **Stormwater Management:** These systems can effectively **filter stormwater runoff,** removing pollutants and sediments before they enter natural waterways.
  - **Industrial Wastewater Treatment:** Constructed wetlands can be adapted to treat specific types of industrial wastewater, depending on the contaminants present.
  - **Agriculture:** They can be used to **treat** agricultural runoff, reduce pollution and improve water quality for irrigation.

Example of Constructed Wetlands in India

- The **Asola Bhatti Wildlife Sanctuary in Delhi** uses constructed wetlands to purify sewage from nearby settlements while also providing a sanctuary for flora and fauna.
- Similarly, the **Kolkata East Wetlands in West Bengal** treat wastewater from Kolkata while supporting local fishing and agriculture.
- In Rajasthan, the **Sariska Tiger Reserve** has embarked on an innovative initiative, utilising constructed wetlands for treating wastewater from nearby villages.

What is the Difference Between Wetlands and Constructed Wetlands?

Feature	Wetlands	Constructed W

	etlands	
Origin	Naturally occurring ecosystems	Engineered systems designed by humans
Formation	Develop over time through geological processes, flooding, or changes in water flow.	Deliberately constructed in a specific location.
Water Source	Varied - precipitation, groundwater, surface water runoff.	Controlled source - wastewater, stormwater runoff, or specific water bodies.
Purpose	Provide a variety of ecological functions like flood control, water purification, habitat for diverse species.	Primarily designed for water treatment (wastewater, stormwater) or specific purposes like habitat creation.
Biodiversity	Established communities of plants, animals, and microbes adapted to the specific wetland type.	Plant species are chosen and introduced, while microbial communities develop over time.
Land Area	Can range from small ponds to vast marshes, typically covering large areas.	Designed with a specific footprint based on treatment needs, can be smaller than natural wetlands.
Regulation	Often protected under environmental regulations due to their ecological importance.	May require permits for construction and operation depending on local regulations.
Maintenance	Minimal human intervention required after establishment.	Regular maintenance needed to ensure proper functioning (water flow, plant health, sediment removal).

What are the Challenges associated with the Constructed Wetlands?

- **Plant Selection: Effective plant selection** in constructed wetlands is critical for nutrient absorption and pollutant removal, with species like cattails, bulrushes, and sedges proving particularly adept at absorbing nitrogen and phosphorus while providing habitat for beneficial bacteria to degrade pollutants.
- **Land Requirement:** Constructing wetlands requires a **significant amount of land**, which might be a limitation in urban areas.
- **Treatment Efficiency:** While effective, constructed wetlands might **not achieve the same level of purification** as conventional treatment plants for heavily polluted water.
- **Maintenance Needs:** Regular maintenance is required to ensure proper functioning and prevent clogging or mosquito breeding.
- **Other Challenges:** There is a need for **clear policies and regulations** to promote their adoption, raising **awareness and technical expertise** among stakeholders, and continuous monitoring and research to optimize their performance.

Way Forward

- **Leveraging Global Best Practices:**
  - **Design Optimisation:** India can learn from countries like **Germany and the Netherlands**, pioneers in constructed wetland design.
    - These nations utilize **multi-stage systems** with free water surfaces (surface flow) and subsurface flow for optimal treatment depending on the influent characteristics.
  - **Performance Monitoring:** The **US Environmental Protection Agency (US EPA)** recommends establishing clear performance monitoring protocols.
    - Regular monitoring of water quality parameters and wetland health is crucial for optimizing treatment efficiency and identifying potential issues.
- **Implementing Constructed Wetlands in India:**
  - **Policy and Regulation:** The **Central Pollution Control Board (CPCB)** has already recognised constructed wetlands as a viable wastewater treatment option.
    - Further policy frameworks could **incentivize their adoption** by municipalities and

industries, along with clear guidelines for design, operation, and maintenance.
- **Financial Instruments:** Exploring innovative financing mechanisms like Public-Private Partnerships (PPPs) and subsidies for constructing and maintaining these systems can attract investment and make them more accessible, particularly for smaller communities.
- **Demonstration Projects:** Establishing successful demonstration projects across diverse geographical and climatic zones in India is crucial.
    - This would showcase the effectiveness of constructed wetlands in real-world scenarios and provide valuable data for future applications.
- **Community Engagement:** Local communities should be involved in the **planning, construction, and operation** of constructed wetlands.
    - Raising awareness about the benefits of these systems and fostering a **sense of ownership** will ensure their long-term success.

Drishti Mains Question:

Q. Discuss the concept of constructed wetlands as a sustainable solution for industrial wastewater treatment in India. Evaluate the challenges and opportunities associated with the widespread adoption of constructed wetlands in the country.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. If a wetland of international importance is brought under the 'Montreux Record', what does it imply? (2014)

(a) Changes in ecological character have occurred, are occurring or are likely to occur in the wetland as a result of human interference.
(b) The country in which the wetland is located should enact a law to prohibit any human activity within five kilometers from the edge of the wetland.
(c) The survival of the wetland depends on the cultural practices and traditions of certain communities living in its vicinity and therefore the cultural diversity therein should not be destroyed.
(d) It is given the status of 'World Heritage Site.'

Ans: (a)

Mains

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)**

India as a Net Exporter of Medical Consumables

For Prelims: Good Manufacturing Practices, **Pharmaceutical quality system**, **Pharmaceutical Companies**, **Drugs Manufacturing Standards**, **PTUAS Scheme**, **PMPDS**, **PLI scheme for Pharmaceuticals**, **Schedule M and WHO-GMP Standards**, Central Drugs Standard Control Organization**,** Drugs and Cosmetics Act, 1940**,**

For Mains: Revised Good Manufacturing Practices Standards, **Indian pharmaceutical industry**, **health, Government policies and interventions**, Consequences of ineffective drug regulations

Source: ET

Why in News?

- India has achieved a **significant milestone** in the medical goods business, becoming a **net exporter** of **medical consumables and disposables** for the **first time** in the **fiscal year 2022-23.**
- This marks a **reversal of an old trend** where imports of such products outweighed exports.

What is the Status of India's Pharmaceutical Industry?

- **About:**
  - India has historically been **dependent on imports** for medical consumables and disposables. India has now reversed this trend, indicating a shift towards self-sufficiency in this sector.
  - India is the **largest manufacturer of generic** medicines globally. Its pharmaceutical industry plays a crucial role in global healthcare, providing affordable **generic medicines.**
  - It is currently valued at **USD 50 billion** as a major pharmaceutical exporter, with over 200+ countries served by Indian pharma exports.
  - It is expected to reach USD 65 Billion by 2024 and to USD 130 Billion by 2030.
  - **Export and Import Statistics:**
    - **Exports:** India exported medical consumables and disposables worth USD 1.6 billion, showing a 16% surge over the previous fiscal year (2021-22).
    - **Imports:** Imports amounted to approximately USD 1.1 billion, indicating a 33% decline.
- **Major Challenges with India's Pharma Sector:**
  - **Lagging Research and Development (R&D):** India's R&D spending in pharma is lower compared to developed nations. This hinders the creation of new drugs.
  - **Limited Innovation Ecosystem:** Collaboration between academia, research institutions, and pharmaceutical companies is weak, **slowing down development of high qualtity drugs and medical devices.**
  - **Price Controls and Profit Margins:** Government price controls on some drugs can limit profits, making it less attractive for companies to invest heavily in R&D for new drugs.
  - **Complex Regulatory Framework:** Navigating the approval process for new drugs can be lengthy and complex which **leads to red tapism.**
  - **Skilled Workforce Shortage:** There's a lack of highly qualified scientists and researchers in the pharma sector, which leads to **overburdened staff affecting efficiency.**
  - **Intellectual Property (IP) Concerns:** Uncertainties around IP protection, due to provisions like **compulsory licensing (Indian Patents Act 1970),** can discourage large pharma investment in India.
  - **Import Dependency:** Despite progress, India remains largely dependent on imports for medical devices, with around 70% sourced from other nations.
    - India's heavy dependence on **Active Pharmaceutical Ingredients (APIs) imports,** particularly from countries like China.
  - **Substandard Drugs:** One significant issue in the Indian pharmaceutical sector is the occurrence of deaths linked to the consumption of substandard or counterfeit drugs.
    - Indian-origin **medicines leads to** multiple deaths of children in Africa **and Central Asia.**

Government Initiatives in the Pharma Sector

- **Production Linked Incentive (PLI) Scheme for Pharmaceuticals**
- **Promotion of Bulk Drug Parks Scheme**
- **Strengthening Pharmaceuticals Industry Scheme**
- **National Policy on Research and Development and Innovation in Pharma-MedTech**

Sector in India
- **Scheme for Promotion of Research and Innovation in Pharma MedTech Sector (PRIP)**
- **Pharmaceuticals Technology Upgradation Assistance (PTUAS) Scheme**
- **Revised Good Manufacturing Practices (GMP)**

What Further Steps Can be Taken to Reform India's Pharma Sector?

- **Legislative Changes and Centralised Database:**
  - **Drugs and Cosmetics Act (1940)** needs to be amended and the establishment of a **centralised drugs database** can enhance surveillance and ensure effective regulation across all manufacturers.
  - Also, implementing common quality standards across all states is necessary to ensure consistent product quality.
- **Encouraging Certification:**
  - Encouraging more pharmaceutical manufacturing units to obtain **World Health Organization (WHO)** Good Manufacturing Practice certification can elevate industry-wide quality standards.
- **Transparency, Credibility, and Accountability:**
  - The regulator and the industry must collaborate to enhance India's drug **regulatory regime**, making it transparent, credible, and aligned with global standards.
- **Focus on Sustainable Manufacturing Practices:**
  - Emphasising sustainable manufacturing practices, including **green chemistry, waste reduction**, and **energy efficiency**, can enhance the sector's environmental sustainability while reducing costs.
- **Moving Beyond Generics:** India excels in producing affordable generic medicines but faces **challenges in developing novel drugs.**
  - Government support through initiatives like PLI and facilitating clinical trial funding can accelerate research and development efforts.
- **Boosting R&D and Innovation:** India's lower expenditure on research and development compared to global leaders can be improved.
  - Focus should be to foster public-private partnerships and provide tax incentives for innovation.

Note

Recently, the Union government has assumed sole authority over the **issuance of manufacturing licences for new drugs intended for export,** thereby transferring this responsibility from state governments.

- This decision was prompted by heightened global scrutiny of Indian-made drugs.
- Consequently, the Central Drugs Standard Control Organisation **(CDSCO)** has been designated as the exclusive licensing authority for drugs in India.
  - Manufacturers are now required to obtain a **No Objection Certificate (NOC)** from the CDSCO's respective zonal office.
- CDSCO is the **Central Drug Authority** for discharging functions assigned to the Central Government under the **Drugs and Cosmetics Act, 1940.**
  - The **Drug Controller General of India (DCGI)** heads the CDSCO.

Drishti Mains Question:

Q. India's recent achievement as a net exporter of medical consumables and disposables marks a significant milestone. How can this achievement be leveraged to strengthen India's position in the global medical goods market?

UPSC Civil Services Examination, Previous Year Question (PYQ):

Prelims:

Q. Which of the following are the reasons for the occurrence of multi-drug resistance in microbial pathogens in India? (2019)

1. Genetic predisposition of some people
2. Taking incorrect doses of antibiotics to cure diseases
3. Using antibiotics in livestock farming
4. Multiple chronic diseases in some people

Select the correct answer using the code given below.

(a) 1 and 2
(b) 2 and 3 only
(c) 1, 3 and 4
(d) 2, 3 and 4

Ans: (b)

Mains:

Q. How is the Government of India protecting traditional knowledge of medicine from patenting by pharmaceutical companies? (2019)

Hoysala's Sri Madhava Perumal Temple Reveals Trade Route

Source: TH

Why in News?

Recently, Inscriptions found at **Sri Madhava Perumal Temple** indicate the existence of a major trade route over 1,000 years ago, connecting the **Kongu region in western Tamil Nadu** with **southern Karnataka and Kerala.**

What are the Key Facts About the Madhava Perumal Temple?

- **About:**
  - It is dedicated to the **Hindu deity Vishnu**, who is worshipped as **Madhava Perumal.** It is located in **Mylapore, Chennai, Tamil Nadu.**
  - The Mylapore region came under the rule of the Hoysala dynasty, particularly **King Veera Ballala III.**
  - The general of the Hoysala army, constructed **Dhandanayaka Fort,** 680 years ago. The **temple** in the Dravidian style of architecture was constructed inside the fort.
    - The area was later ruled by the Vijayanagara Empire and Tipu Sultan.
    - The Battle of Sathyamangalam (1790), during the Third Anglo-Mysore War (1790-1792), also took place near the fort.
  - The temple is believed to be the **birthplace of Peyalvar**, one of the first three of the **twelve Alvar saints** of the **6^{th}-9^{th} century CE.**
  - The temple, largely **submerged in the water-spread area** of the **Bhavanisagar dam in Erode district**, became visible as the water level in the dam dipped.

- **Temple Inscription:**
  - The inscriptions revealed the existence of a **village named Thuravalur.**
  - The area served as a **trunk road**, and **traders crossed River Bhavani and River Moyar** to reach Wayanad in Kerala and various places in Karnataka.
  - **Construction of the Bhavanisagar dam** in 1948 resulted in the relocation of nearby residents and the shifting of temple idols to new locations in 1953.

Bhavanisagar Dam

- It is located in **Erode district,** Tamil Nadu, India.
- The dam is constructed on the **Bhavani River.** It is one of the world's largest earthen dams.
- **Bhavani River originates from the Nilgiri hill**s of the Western Ghats, enters the Silent Valley National Park in Kerala and flows back towards Tamil Nadu. The Bhavani River is one of the main tributaries of the **Cauvery River.**

What are the Key Facts about Hoysala Dynasty?

- **Origin and Rise:**
  - The Hoysalas were **feudatories of the** Chalukyas of Kalyana, or the Western Chalukya Empire.
    - The first kings came from the hills **northwest of Dorasamudra (present-day Halebid),** which became their capital in 1060 AD.
  - The most notable rulers of the Hoysala dynasty were **Vishnuvardhana, Veera Ballala II, and Veera Ballala III.**
    - **Vishnuvardhana** (also known as Bittideva) was the **greatest king** of the Hoysala dynasty.
  - They governed areas spanning **Karnataka and Tamil Nadu** in the **Kaveri (Cauvery) river valley** between the **11th- 14th century.**
  - Later, the **Vijayanagar dynasty succeeded** the Hoysalas.
- **Religion and Culture:**
  - The dynasty patronised various religions, such as **Hinduism, Jainism, and Buddhism.**
  - **King Vishnuvardhana** was initially a Jain but later converted to Vaishnavism under the influence of the Saint Ramanuja.
- **Temple Architecture:**
  - The Hoysala Temples were built **during the 12th and 13th centuries CE,** showcasing the **unique architectural and artistic brilliance of** Vesara style.
  - Among Hoysala temples, **Chennakeshava Temple in Belur, Hoysaleshwara Temple in Halebid, Keshava Temple of Somanathapur** are UNESCO World Heritage Sites and protected by Archaeological Survey of India (ASI).
  - Hoysala architecture is known for its **distinctive blend of Bhumija style** prevalent in Central India, the **Nagara traditions** of northern and western India, and the **Karnataka Dravida** modes favoured by the Kalyani Chalukyas.
    - These contain **multiple shrines** grouped around a **central pillared hall** and laid out in the shape of an intricately designed star.
  - They are **made out of soapstone** which is a relatively soft stone, the artists were able to carve their sculptures intricately.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. The Nagara, the Dravida and the Vesara are the:(2012)

(a) three main racial groups of the Indian subcontinent

(b) three main linguistic divisions into which the languages of India can be classified

(c) three main styles of Indian temple architecture

(d) three main musical Gharanas prevalent in India

Ans: c

Mains

Q. Chola architecture represents a high watermark in the evolution of temple architecture. Discuss **(2013)**

Regulatory Action Against Kotak Mahindra Bank by RBI

Source: TH

Why in News?

The Reserve Bank of India (RBI) has barred **Kotak Mahindra Bank (KMB)** from onboarding new customers on its online and mobile banking channels and issuing fresh credit cards.

- However, the bank is allowed to provide these services to its existing customers.

What Led to the Restrictions by the Reserve Bank of India?

- RBI observed "**serious deficiencies and non-compliances**" in KMB's:
  - IT inventory and user access management.
  - Data leak and leak prevention strategy.
  - Business continuity and disaster recovery rigor and drill.
- These deficiencies were identified during RBI's examination of the bank's systems for 2022 and 2023.
- The regulator found that **KMB failed to address these concerns comprehensively** and promptly, despite recommendations and corrective action plans.
- The bank was also deemed non-compliant with **RBI's subsequent recommendations or 'Corrective Action Plans' (CAPs).**
  - CAPs are part of an intervention scheme of the RBI to ensure robustness of regulated entities.
- **Impact of RBI's Restriction:**
  - The regulatory action may set back KMB's credit growth and profitability, as credit cards are a higher-yielding target growth segment for the bank.
    - It could take a year for KMB to fully address RBI's key concerns, as implementing changes and the external audit will take time.
  - The ban would hinder the growth trajectory of KMB's retail products, adversely impacting margins and profitability.

What is the Role of the RBI in Banking Regulation?

- **Banking Regulation Act of 1949:**
  - The RBI is the governing body for regulating and supervising the banks. Banking Regulation Act of 1949 is an act that provides a framework for regulating the banks of India.
    - This Act gives RBI the power to **control the behavior of banks**. This Act was passed as the **Banking Companies Act of 1949.**

    - This Act monitors the **day-to-day operations of the bank.** Under this Act, the RBI can **license banks, put regulation over shareholding and voting rights of shareholders,** look over the appointment of the boards and management, and lay down the instructions for audits. **RBI also plays a role in mergers and liquidation.**
    - **No banking company can operate in India without a license from the RBI**, which can inspect the company's books before granting the license and can also cancel the license if the company ceases its banking operations in India.
- Prompt Corrective Action (PCA) Framework:
    - The PCA Framework by the RBI is a supervisory strategy directed at banks that **exhibit weak financial metrics.**
    - The RBI's PCA Framework involves monitoring key performance indicators of banks, such as the Capital to Risk-weighted Assets Ratio (CRAR), Net Non-Performing Assets (NNPA) ratio, **and the Leverage Ratio** (level of debt incurred by a business entity against several other accounts in its balance sheet, income statement).
        - If a bank breaches certain risk thresholds set for these indicators, the **RBI may invoke PCA, which can lead to restrictions on dividend distribution, branch expansion, and management compensation, among other things.**
    - The objective of the **PCA Framework is to encourage banks to take corrective steps** preemptively to mitigate the risks posed by low capital levels, poor asset quality, or unprofitable operations.
    - It also aims to impose market discipline by making the financial conditions of banks transparent.

Comparative Analysis with Past Actions by the RBI

- In December 2020, HDFC Bank was barred from launching new digital products and sourcing new credit card customers due to **recurring outages in its internet and mobile banking platforms.**
- In October 2023, the **Bank of Baroda** was directed to suspend fresh onboarding of customers onto its 'Bob World' mobile application over "certain material supervisory concerns."

UPSC Civil Services Examination, Previous Year Questions (PYQs)

Prelims

Q. Which of the following statements is/are correct regarding the Monetary Policy Committee (MPC)? (2017)

1. It decides the RBI's benchmark interest rates.
2. It is a 12-member body including the Governor of RBI and is reconstituted every year.
3. It functions under the chairmanship of the Union Finance Minister.

Select the correct answer using the code given below:

(a) 1 only
(b) 1 and 2 only
(c) 3 only
(d) 2 and 3 only

Ans: A

Q. If the RBI decides to adopt an expansionist monetary policy, which of the following would it not do? (2020)

1. Cut and optimize the Statutory Liquidity Ratio

2. Increase the Marginal Standing Facility Rate
3. Cut the Bank Rate and Repo Rate

Select the correct answer using the code given below:

(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: B

Understanding Magnetic Resonance Imaging

Source: TH

Why in News?

Recently, Magnetic Resonance Imaging (MRI) has been a topic of discussion as an indispensable tool for non-invasive exploration inside the human body.

What is Magnetic Resonance Imaging (MRI)?

- **About:**
  - MRI is a **non-invasive diagnostic procedure** used to obtain **images of soft tissues** within the body.
    - Soft tissue is any tissue that hasn't become **harder through calcification.** Calcification of soft tissue is a condition where calcium salts accumulate in soft tissue, causing it to harden.
  - It is widely utilised for imaging various body parts such as the brain, cardiovascular system, spinal cord, joints, muscles, liver, and arteries.
    - Unlike X-rays, which use radiation, MRI scans leverage powerful magnets and radio waves to create detailed images of **soft tissues** within the body.
  - **Professor Paul C. Lauterbur and Peter Mansfield** won the **2003 Nobel Prize in Physiology** or Medicine for their innovative research which resulted in the **invention of MRI.**
- **Working Principle of MRI:**
  - **Hydrogen Atom Utilisation**: An MRI procedure utilises hydrogen atoms present in the body part being scanned.
  - **MRI Machine Components:** The MRI machine consists of four essential components, including a **superconducting magnet**, a radiofrequency pulse emitter, and a detector.
  - **Magnetic Field Application:** The superconducting magnet produces a **strong and stable magnetic field** around the body, causing the hydrogen atoms' spin axes to align either parallel or antiparallel to the field.
  - **Radiofrequency Pulse Emission**: A radiofrequency pulse is emitted into the body part under the scanner, exciting only the small population of unmatched hydrogen atoms.
  - **Signal Detection and Image Formation:** The emitted energy from the excited atoms is detected by a receiver and converted into signals.
    - These signals are then used by a computer to create two- or three-dimensional images of the scanned body part.
- **Importance of MRI:** MRI plays a crucial role in observing and treating cancers like prostate and rectal cancer, as well as tracking neurological conditions including Alzheimer's, dementia,

epilepsy, and **stroke.**
    - Additionally, researchers use MRI scans to study changes in blood flow, aiding in understanding brain activity, known as functional MRI.
- **Advantages of MRI:**
    - **High Precision**: MRI machines scan specific body portions with gradient magnets.
    - **Safety**: MRI scans pose no long-term harm, and magnetic field effects are well-studied.
    - **Early Disease Detection:** MRI aids early detection of diseases like cancer and multiple sclerosis.
    - **Minimally Invasive Procedure:** MRI is safe and comfortable, unlike surgery, benefiting children and the elderly.
- **Disadvantages of MRI:**
    - **Cost:** MRI machines are expensive to purchase and maintain, leading to high diagnostic costs for patients.
    - **Discomfort and Claustrophobia:** Patients must lie still for extended periods inside the MRI machine, which can be uncomfortable, especially for claustrophobic individuals.
    - **Limited Imaging Capability**: MRI struggles to image certain tissues like bone, air, and some types of implants effectively due to their physical properties.
    - **Strong Magnetic Fields**: The powerful magnetic fields used in MRI can pose potential risks for patients with certain medical implants (e.g., pacemakers) or metallic objects lodged in their bodies.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q. With reference to 'Near Field Communication (NFC) Technology', which of the following statements is/are correct? **(2015)**

1. It is a contactless communication technology that uses electromagnetic radio fields.

2. NFC is designed for use by devices which can be at a distance of even a metre from each other.

3. NFC can use encryption when sending sensitive information.

Select the correct answer using the code given below:

(a) 1 and 2 only

(b) 3 only

(c) 1 and 3 only

(d) 1, 2 and 3

Ans: (c)

Q. With reference to Visible Light Communication (VLC) technology, which of the following statements are correct? **(2020)**

1. VLC uses electromagnetic spectrum wavelengths 375 to 780 nm.

2. VLC is known as long-range optical wireless communication.

3. VLC can transmit large amounts of data faster than Bluetooth.

4. VLC has no electromagnetic interference.

Select the correct answer using the code given below:

(a) 1, 2 and 3 only

(b) 1, 2 and 4 only

(c) 1, 3 and 4 only

(d) 2, 3 and 4 only

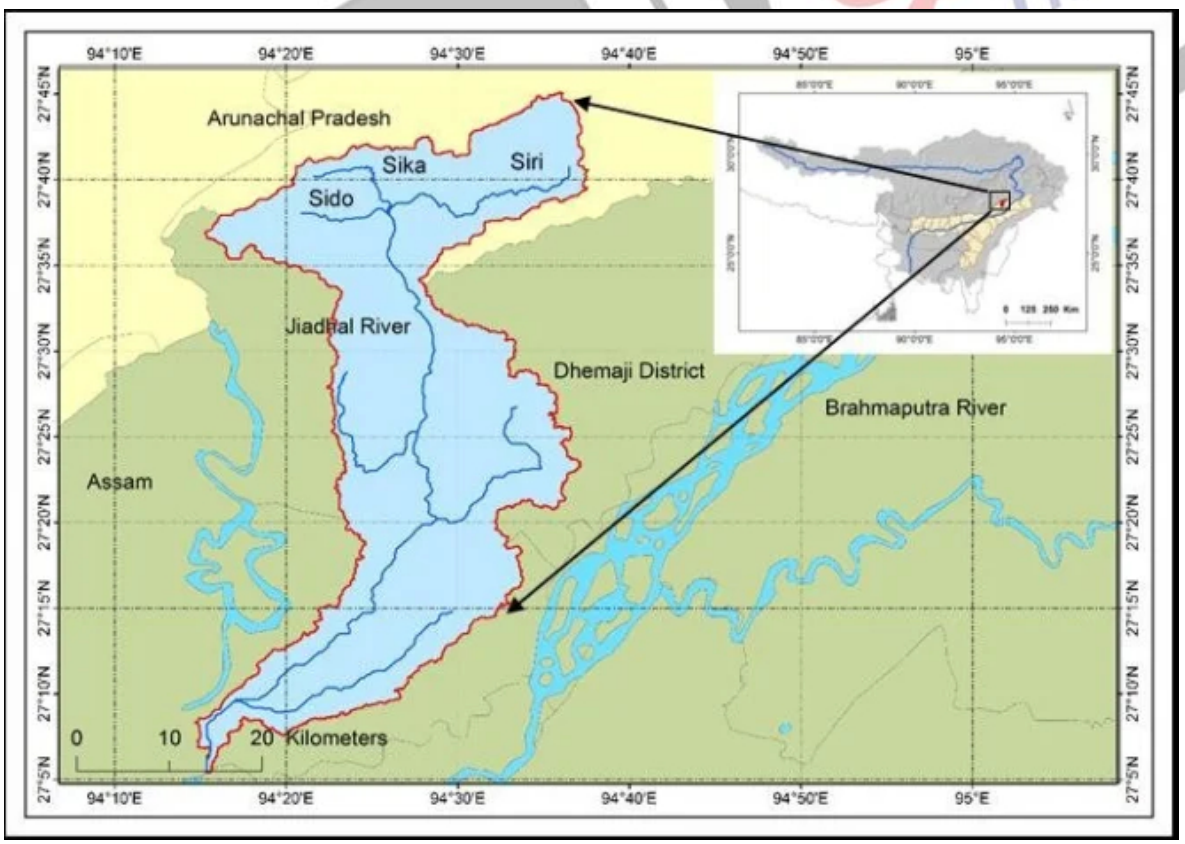
Ans: (c)

Jiadhal River Assam

Source: DTE

Heavy precipitation in Assam is actively reshaping the path of the **Jiadhal River,** leading to soil erosion **and posing a significant threat to agriculture.**

- It originates from the **sub-Himalayan mountains of Arunachal Pradesh** at an altitude of **1247 meters**, this river serves as a northern tributary to the **Brahmaputra River.**
- It flows through a **narrow gorge in Arunachal Pradesh**, and the river emerges into the plains of Assam, specifically in the Dhemaji district, known as the **"Sorrow of Dhemaji" due to its annual** floods **and erosion,**
- It travels **downstream from Gogamukh,** which is renamed the **Kumotiya River.**
- As a **northern sub-tributary of the Brahmaputra River,** it merges with the **Subansiri River** near its endpoint, augmenting the Brahmaputra's water volume and force.



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EC Stops Release of Aid Under Rythu Bharosa Scheme

Source: TH

Recently, the Election Commission of India (ECI) has put on hold the disbursement of amounts under **Rythu Bharosa** (previously known as Rythu Bandhu) till the completion of polling for the Lok Sabha election in the State.

- The Chief Minister of Telangana violated the Model Code of Conduct (MCC) by publicly speaking about ensuing disbursement under the Rythu Bharosa.
- The **MCC** is a set of guidelines issued by the ECI to regulate the conduct of political parties and candidates during elections.
- Article 324 of the Constitution grants the ECI the authority to oversee and ensure the **conduct of impartial elections** for both the Parliament and **State Legislatures.**
- The scheme '**RYTHU BHAROSA'** is one of the **nine navratna welfare schemes l**aunched by Telangana Govt in **June 2019.**
- The scheme provides financial assistance of **Rs. 13,500** per farmer family every year including tenant farmers also across the state.

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Approval for Phase 2 Trials of MTBVAC

Source:TH

Recently, The Central Drug Standard Control Organisation's (CDSCO) has approved the proposal to conduct the **phase II** clinical trial of the Mycobacterium Tuberculosis (Live Attenuated) Vaccine.

- The **MTBVAC** is the first vaccine against TB derived from a human source to begin clinical trials in adults in India.
- **Bharat Biotech International Limited** in collaboration with **Spanish biotechnology company Biofabri** have started a series of clinical trials to evaluate the safety, immunogenicity, and efficacy of **MTBVAC** in India.
- MTBVAC is being developed for two purposes as a more effective and potentially long-lasting vaccine than BCG (Bacillus Calmette and Guérin) for newborn children, and for the **prevention of TB in adults and adolescents,** for whom there is currently no effective vaccine.
- MTBVAC is the only vaccine against tuberculosis in clinical trials based on a **genetically modified** form of the pathogen isolated from **humans Mycobacterium tuberculosis.**
- **BCG** is an only attenuated variant of the bovine TB pathogen which is older than a hundred years old and has a very limited effect on pulmonary tuberculosis.

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Elected Women Representatives of PRI Participated in CPD57

Source: PIB

Elected Women Representatives (EWRs) from India's Panchayati Raj Institutions participated in the United Nations **Commission on Population and Development (CPD) Event** titled **"Localising the SDGs: Women in Local Governance in India Lead the Way".**

- The event was part of the 57th session of the **United Nations Commission on Population and Development** (CPD57).
  - It was organised by the Permanent Mission of India to the **United Nations** and the Ministry of Panchayati Raj in collaboration with the United Nations Population Fund (UNFPA) at the **UN Headquarters Secretariat Building** in New York.
- India's Panchayati Raj system **comprises more than 1.4 million EWRs,** showcasing a narrative of empowerment, inclusion, and progress in women's leadership.
- **About UN Commission of Population and Development ()CPD:**
  - A Population Commission was established by the Economic and Social Council (ECOSOC) in 1946, which was renamed as the **Commission on Population and Development** by the UN General Assembly in 1994.
  - The Commission is composed of **47** Member countries.
  - Member countries are elected by the **ECOSOC for a period of 4 years** on the basis of geographic distribution.

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Widal Test in Diagnosing Typhoid in India

Source: TH

The widespread use of the **Widal test for diagnosing** typhoid **in India** has raised concerns about its accuracy and implications for public health management.

- The **Widal test**, a **rapid blood test,** is extensively used in India for diagnosing typhoid fever, despite its limitations and propensity for erroneous results.
- Typhoid, caused by ***Salmonella typhi bacteria***, spreads through **contaminated food and water**, presenting as enteric fever with symptoms like **high fever, stomach pain, weakness, nausea, vomiting, and rash.**
  - Some carriers **may remain asymptomatic,** shedding bacteria for months. Untreated, it can be life-threatening, mimicking other diseases like malaria and influenza.
- The gold standard for diagnosing typhoid involves i**solating the bacteria from a patient's blood or bone marrow and growing them in the lab,** which is resource-intensive and time-consuming.
- The **Widal test detects** antibodies **against the bacteria but can yield false positives and negatives** due to various factors such as **prior antibiotic treatment and cross-reactivity** with antibodies from other infections or vaccinations.
  - Misdiagnosis of typhoid can lead to delayed treatment and complications, contributing to the obscured **burden of the disease in India.**
- Overuse of antibiotics driven by the Widal test contributes to antimicrobial resistance (AMR), posing a significant public health threat.
- Improved access to diagnostics and AMR surveillance is vital for addressing typhoid challenges.

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