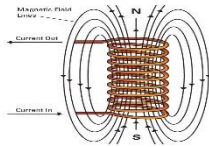


WHAT IS AN ELECTROMAGNET?



Invented in 1824 by the William Sturgeon, electromagnets are a fixture of modern life, appearing in loudspeakers, motors, magnetic resonance imaging (MRI) machines, maglev trains, and particle accelerators.

- Electromagnets are **devices that produce a magnetic field** when an electric current flows through a coil of wire.
- The magnetic field is concentrated in the **hole of the coil**. The **strength** of the magnetic field **can be controlled by adjusting the electric current**. When the current is turned off, the magnetic field disappears.

Properties and Advantages:

- Electromagnets can be turned on and off by controlling the electric current.
- They are more powerful than permanent magnets because the magnetic field can be amplified by the magnetic core.
- Electromagnets are widely used in various devices such as motors, generators, MRI machines, and magnetic separation equipment.

Applications:

- Electromagnets are used in various industries for tasks like lifting and moving heavy metal objects, sorting materials, and generating motion.
- They are also used in medical settings for imaging and in consumer devices like electric doorbells and card readers.

Disadvantages:

- Electromagnets require a continuous supply of electric power to maintain their magnetic field.
- They are less efficient than permanent magnets in terms of energy usage.

MATSYAYAAN 6000



India set to be the 6th country to have its own Deep Sea Mission; 1st Stage of harbor trail (40-50m) deep of deep sea mission planned by September 2024; The Mission has the potential to contribute greatly to the overall growth of Indian economy

- The Matsya 6000 is a **three-person submersible** that will be able to go **6,000 metres** under the sea. The vessel is being developed by Chennai's **National Institute of Ocean Technology (NIOT)**.
- **Structure:** Made of **80mm-thick titanium alloy**, it will be able to withstand a pressure 600 times greater than that at sea level. The Matsya 6000 will be able to operate from **12 to 16 hours straight** and will have an **oxygen supply of 96 hours**.

National Institute of Ocean Technology:

- It was established in **November 1993** as an autonomous society under the **Ministry of Earth Sciences**.
- **Objectives:** To develop reliable **indigenous technologies** to solve the various engineering problems associated with harvesting of non-living and living resources in the **Indian Exclusive Economic Zone (EEZ)**, which is about two-thirds of the land area of India.

Deep Sea Mission:

- The Deep Ocean Mission (DOM) is an ambitious Indian initiative to **explore and harness the depths of the ocean**.
- It is a five-year mission, approved by the Union Cabinet in **2021**, with a budget of nearly **₹4,077 crore**.
- The mission aims to develop technologies for **deep-sea mining, manned submersibles, and underwater robotics**, as well as for ocean climate change advisory services, deep-ocean survey and exploration.

EXERCISE RED FLAG 2024



An Indian Air Force (IAF) contingent participated in the Exercise Red Flag 2024 conducted at Eielson Air Force Base, Alaska of the United States Air Force, from 04 Jun to 14 Jun 24.

- This was the **second edition of Ex Red Flag 2024**, which is an advanced aerial combat training exercise, held four times in a year by the **US Air Force**.
- **Participation** of the Indian Air Force along with Republic of Singapore Air Force (RSAF), Royal Air Force (RAF) of the United Kingdom, Royal Netherlands Air Force (RNLAf), German Luftwaffe, and the US Air Force (USAF).
- Red Flag is an **air combat exercise** featuring **realistic combat scenarios**. Forces are divided into **Red Force** (simulating Air Defence, primarily with USAF Aggressor Squadron's F-16 and F-15 aircraft) and **Blue Force** (simulating Offensive Composite elements).
- This year marked the **debut of the Indian Air Force's Rafale aircraft** in the exercise, operating alongside RSAF and USAF F-16s, F-15s, and A-10s.
- The missions included **Beyond Visual Range combat** exercises in Large Force Engagements, focusing on Offensive Counter Air and Air Defence roles.

WHAT IS THE MONTREAL PROTOCOL?

New research by a team of scientists has shown that atmospheric concentrations of a class of ozone-depleting chemicals used as refrigerants, foam blowing agents, and solvents peaked in 2021 and are now beginning to decline as nations comply with restrictions called for by the Montreal Protocol.



- The Montreal Protocol on substances that deplete the ozone layer is a landmark multilateral environmental agreement that **regulates the production and consumption** of nearly 100 man-made chemicals referred to as **ozone depleting substances (ODS)**.

- ODS are substances that are commonly used in products such as **refrigerators, air conditioners, fire extinguishers** and aerosols.
- When released into the atmosphere, those chemicals **damage the stratospheric ozone layer**, Earth's protective shield that protects humans and the environment from harmful levels of ultraviolet radiation from the sun.
- The Montreal Protocol sits under the **Vienna Convention** for the Protection of the Ozone Layer (the Vienna Convention).
- Adopted on 16 September, 1987, the Protocol is, to date, one of the rare treaties to achieve **universal ratification**.
- The Montreal Protocol phases down the consumption and production of the different ODS in a **stepwise manner**, with different timetables for developed and developing countries (referred to as "Article 5 countries").
- Under this treaty, all **parties have specific responsibilities** related to the phase out of the different groups of ODS, control of ODS trade, annual reporting of data, national licensing systems to control ODS imports and exports, and other matters.
- Developing and developed **countries have equal but differentiated responsibilities**, but most importantly, both groups of countries have binding, time-targeted, and measurable commitments.
- The **meeting of the parties is the governance body** for the treaty, with technical support provided by an Open-ended Working Group, both of which meet on an annual basis.
- The Parties are assisted by the Ozone Secretariat, which is based at **UN Environment Programme headquarters in Nairobi, Kenya**.

Kigali Amendment:

- In 2016, parties to the Montreal Protocol adopted the Kigali Amendment to **phase down production and consumption of hydrofluorocarbons (HFCs)** worldwide.

- They are **widely used alternatives to ODS**, such as hydrochlorofluorocarbons (HCFCs) and chlorofluorocarbons (CFCs), which are already controlled under the Protocol.
 - They are powerful greenhouse gases and global implementation of the Kigali Amendment is expected to avoid up to half a degree Celsius of temperature rise by 2100.
 - It will phase down HFC consumption and production based on the carbon dioxide equivalent (CO₂e) by 80-85 percent by 2045.
-

GLOBAL GENDER GAP REPORT 2024



The world has seen modest progress in closing the gender gap, however, the pace remains sluggish, according to the latest edition of the World Economic Forum's Global Gender Gap Report.

It is an **annual index** designed to measure gender equality.

- It benchmarks gender-based gaps in **four areas**: economic participation and opportunity; educational attainment; health and survival and political empowerment.
- It is released by the **World Economic Forum (WEF)**.
- It is the longest-standing index tracking the progress of numerous countries' efforts towards closing these gaps over time since its inception in 2006.
- **Highlights of 2024 Report:**
 - The **global gender gap score** in 2024 for all 146 countries stands at **5%**, a 0.1 percentage point improvement on last year.
 - At the current pace, it will take another 134 years to achieve full gender parity.
 - **India slipped two places to 129th** place as **Iceland retained its top position** in the rankings for the 15th consecutive year.
 - It was followed in the top 10 by Finland, Norway, New Zealand, Sweden, Nicaragua, Germany, Namibia, Ireland, and Spain.

- With a population of over 1.4 billion, India closed 64.1% of its gender gap in 2024.
 - In South Asia, India was ranked fifth after Bangladesh, Nepal, Sri Lanka, and Bhutan, while Pakistan was ranked last.
 - In the world, **Sudan was ranked last** on the index of 146 countries, while Pakistan fell three places to 145th.
 - India was among the economies with the **lowest levels of economic parity**, with Bangladesh, Sudan, Iran, Pakistan, and Morocco, as all of them registered less than 30 percent gender parity in estimated earned income.
 - **India showed the best gender parity in terms of enrolment in secondary education** and ranked 65th globally on political empowerment of women.
 - With regard to parity in number of years with female/male heads of state for the last 50 years, India ranked 10th.
-

ON THE SIZE OF COUNCIL OF MINISTERS

Council of Ministers (COM)

- **Constitutional Provisions**
 - **Article 74 - Council of Ministers to aid and advise the President**
 - There shall be a Council of Ministers with the Prime Minister at the head to aid and advise the President, who shall, in the exercise of his functions, act in accordance with such advice.
 - **Article 75**
 - **Appointment of Ministers:** The Prime Minister is appointed by the President, and the other Ministers are appointed by the President on the advice of the Prime Minister.
 - **Collective Responsibility:** The Council of Ministers is collectively responsible to the Lok Sabha (House of the People).
 - **Term of Office:** Ministers hold office during the pleasure of the President.

- **Salaries and Allowances:** The salaries and allowances of Ministers are determined by Parliament.
- **Composition of the Council of Ministers**
 - The COM consists of a **Cabinet minister, MoS with independent charge, MoS and a Deputy Minister.**
 - **Cabinet Ministers** - They are the senior-most ministers and are part of the decision-making process at the highest level.
 - **Ministers of State (Independent Charge)** - These ministers handle specific portfolios without the oversight of a Cabinet Minister. They report directly to the Prime Minister.
 - **Ministers of State** - They assist Cabinet Ministers in their duties and responsibilities and may be assigned specific tasks within their ministries.
 - The Constitution does not classify the members of the COM into different ranks. All this has been done informally, following the British practice.

Constitutional limit on COM

- **National Commission to Review the Working of the Constitution (2000):** Chaired by Justice Venkatachaliah, the commission suggested a ceiling of 10% of the total strength of the Lok Sabha/Legislative Assembly for the number of ministers at the Centre/State level.
- **91st Constitutional Amendment (2003)**
 - **Ministerial Ceiling:** The amendment limited the total number of ministers, including the Prime Minister/Chief Minister, to 15% of the total strength of the Lok Sabha/State Legislative Assembly.
 - **Minimum Requirement:** No minimum requirement at the central level, but smaller states must have at least 12 ministers.
 - **Union Territories:** For NCT of Delhi and Jammu & Kashmir, the maximum limit is 10% of the total strength of its Assembly.

Discrepancies in constitutional limits imposed by 91st amendment

- **Appointment of Parliamentary Secretaries (PS) in various States**
 - States appoint PS to bypass the limit on the number of ministers imposed by the 91st Amendment.
 - The office of Parliamentary Secretary (PS) originates from the British system. The post was first created in 1951.
 - PS positions have not been regular in Central governments, with the last appointment made in 1990.
 - **Variations in Ministerial Limits**
 - **Smaller States**
 - States like Sikkim, Goa, and northeastern states have a minimum of twelve ministers despite populations ranging from seven to forty lakhs.
 - **Union Territories**
 - **NCT of Delhi** - Maximum of seven ministers for a population of over 2 crores.
-

GANDHI SAGAR WILDLIFE SANCTUARY: INDIA'S SECOND HOME FOR CHEETAHS

The sanctuary (notified in **1974**) is spread across (an area of 368.62 sq km) the districts of Mandsaur (187.12 sq km) and Neemuch (181.5 sq km) in **western MP**, right on the border with Rajasthan.

- **The Chambal River** cuts the sanctuary into two almost equal halves and the **Gandhi Sagar dam** (constructed on the river in 1960) lies within the area of the sanctuary.
- **Why is Gandhi Sagar an ideal habitat for cheetahs?** According to MP's wildlife officials, **the sanctuary makes for perfect cheetah habitat**, as it looks like **Maasai Mara** - a national reserve in Kenya known for its savanna wilderness and wildlife.

Preparations for the Introduction of Cheetahs in Gandhi Sagar:

- Currently, an area of 64 sq km has been developed for the cheetahs, at a cost of Rs. 17.72 crores.
- A **soft release enclosure** (or boma, which is 1 sq km in area) has been constructed to ensure a suitable and secure habitat for the cheetahs upon their arrival.
 - A **hospital** has also been constructed to cater to the needs of cheetahs.
- In order to gauge the existing ecological dynamics, the wildlife officials are currently in the process of **conducting a comprehensive status assessment of herbivores and predators** in the sanctuary.

Challenges in Making Gandhi Sagar a Viable Cheetah Habitat:

- **Food:** For cheetahs to sustainably survive in Gandhi Sagar, the first step is **prey base augmentation**, i.e. increasing the number of animals that the wild cats can prey upon.
- **Leopard and other co-predators:** Just like in Kuno, the leopard population in Gandhi Sagar will pose a threat to cheetahs, with the two feline predators possibly clashing with each other for the same prey.
- **Human habitation:** Unlike Kuno, highways and human habitation pass right outside the boundary of the protected area in Gandhi Sagar.
- **Inter and intra state coordination:** The potential of expanding the cheetah habitat in Gandhi Sagar to an area of around 2,000 sq km will depend on
 - The coordination between **Rajasthan's** Bhainsrodgarh sanctuary,
 - As well as the territorial divisions of **Mandsaur and Neemuch**.
- **Infection:** The final call on when the cheetahs will be imported from Namibia and South Africa will be made after the monsoons, during which the cats may be vulnerable to infection.