

# MANTHAN

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# 1. PM Modi awarded Sri Lanka Mitra Vibhushana

- Prime Minister Narendra Modi was awarded the ‘Sri Lanka Mitra Vibhushana’, the country’s highest civilian honour, by Sri Lankan President Anura Kumar Dissanayake.
- The PM dedicated the award to the 1.4 billion countrymen and “the deep-rooted friendship” between India and Sri Lanka.
- The two leaders met as part of the PM’s state visit following Dissanayake’s invitation.
- The President’s office described this visit as demonstrating the shared commitment to the theme “Friendship of Centuries – Commitment to a Prosperous Future”.
- According to MyGov India, this is the Prime Minister’s 22<sup>nd</sup> international honour.

## What is the Sri Lanka Mitra Vibhushana?

- The Sri Lanka Mitra Vibhushana honours Heads of State and government heads with whom Sri Lanka has cordial relations.
- It appreciates “their friendship towards and solidarity with the people of Sri Lanka”.
- Instituted in 2008 by then-president Mahinda Rajapaksa, it is the foremost among awards granted to foreigners.
- According to a 2014 press release, this award ranks higher than the national honours granted by Sri Lanka, including the Sri Lanka Rathna (equivalent to the Bharat Ratna).
- “The ‘Sri Lanka Mitra Vibhushana’ Honour will take precedence over the National Honours awarded to non-Sri Lankans...,” according to a gazette notification cited.

## What does the award comprise?

- The award consists of a citation and a silver medal studded with Navarathna, or nine Sri Lankan gems.
- The Navarathna surrounds a globe encircled by lotus petals.
- The medal represents “the enduring friendship between India and Sri Lanka.”
- At its centre is a Pun Kalasa, a ceremonial pot with rice sheaves, akin to the kalasa used during Sankranti. It signifies prosperity and renewal.
- The top of the medal bears symbols of the Sun and the Moon. It also features a Dharma Chakra, representing the shared Buddhist heritage of both countries.
- The medal is worn around the neck with a 6.5 cm wide ribbon.

## Who are the past winners?

- The award is granted at the President’s discretion.
- The names of all recipients are recorded in a special register for the purpose.

## Only four people have been awarded so far.

- Former Maldives President Maumoon Abdul Gayoom, then approaching the end of his reign, became the inaugural recipient of the award in February 2008.
- In January 2014, Rajapaksa conferred the honour on Palestinian President Mahmoud Abbas and the former President of Palestine, Yasser Arafat (posthumously).

- The awards were reportedly presented at a ceremony in Palestine, where the Palestinian government conferred Rajapaksa with its highest state honour, the Star of Palestine.

## India and Sri Lanka Relationship

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- India and Sri Lanka share deep-rooted, multifaceted relations shaped by geography, history, culture, religion, and economic cooperation.

### 1. Historical & Cultural Ties

- **Buddhism:** India is the birthplace of Buddhism, and Sri Lanka is predominantly Buddhist. Pilgrimage and cultural exchanges strengthen ties (e.g., Bodh Gaya in India and Anuradhapura in Sri Lanka).
- **Ramayana Connection:** Mythologically, the Ramayana has strong links to Sri Lanka (Ravana's kingdom) and India (Lord Rama).
- Shared linguistic and ethnic heritage (Tamil population in Northern Sri Lanka and Tamil Nadu).

### 2. Political and Diplomatic Relations

- India and Sri Lanka established diplomatic ties in 1948, immediately after Sri Lanka's independence.
- Regular high-level visits and bilateral engagements take place — including meetings between prime ministers, foreign ministers, and presidents.
- India has supported Sri Lanka at international forums including the UNHRC, balancing human rights concerns with regional cooperation.

### 3. Economic Relations

- India is one of Sri Lanka's largest trading partners.
- Bilateral trade (as per recent years) stands at over \$5 billion annually.
- India-Sri Lanka Free Trade Agreement (ISFTA) is in place since 2000.
- Indian investments in Sri Lanka include sectors like petroleum, telecom, IT, banking, and infrastructure.
- India has offered lines of credit and assistance (e.g., in post-war and post-crisis reconstruction, housing, railways).

### 4. Strategic & Security Ties

- Maritime cooperation is significant due to the shared Indian Ocean region.
- Both countries collaborate in counter-terrorism, coastal surveillance, and anti-smuggling operations.
- India provides training and support to the Sri Lankan Armed Forces.

### 5. Challenges

- **Fishermen Issue:** Frequent arrests of Indian fishermen by the Sri Lankan Navy due to poaching or crossing maritime boundaries.
- **Tamil Issue:** India's concern over the welfare of Tamils in Sri Lanka, especially after the civil war, sometimes leads to diplomatic sensitivity.
- **Chinese Influence:** Sri Lanka's increasing ties with China (e.g., Hambantota Port lease to China) has raised concerns in India about regional balance and security.

### 6. Recent Developments (2023–2025)

- India supported Sri Lanka during its economic crisis (2022–2023) with aid worth over \$4 billion, including fuel, food, and medicines.
- Launch of energy and connectivity projects — plans to link both countries through undersea power cables, ferry services, and possibly land bridge proposals.
- India and Sri Lanka are discussing economic corridor projects, RuPay card implementation, and strengthening BIMSTEC and Indian Ocean cooperation.

## QUESTIONS

**Solve the multiple choice questions:**

1. Which of the following statements is Not True regarding the 'Bharat Ratna'?
  1. Any person without distinction of race, occupation, position or sex is eligible for these awards.
  2. The recommendations for Bharat Ratna are made by the Prime Minister himself to the President.
  3. The number of annual awards is restricted to a maximum of three in a particular year.
  4. The Award does not carry any monetary grant.

Select the correct answer using codes given below:

  - A. 1, 2 and 4 only
  - B. 3 only
  - C. 1 and 3 only
  - D. 1, 2, 3 and 4
2. Which of the following statements are True regarding the 'Bharat Ratna'?
  1. The award was originally limited to achievements in the arts, literature, science, and public services, but the Government of India expanded the criteria to include "any field of human endeavor" in December 2011.
  2. The first recipients of the Bharat Ratna were C. Rajagopalachari, Sarvepalli Radhakrishnan and C. V. Raman, who were honoured in 1954.
  3. The original statutes did not provide for posthumous awards but were amended in January 1977.
  4. The Bharat Ratna was suspended only once in the history.
  5. As of April 2025, Bharat Ratna was awarded to only two foreigners.

How many of the above statements are True?

  - A. Only two statements
  - B. Only three statements
  - C. Only four statements
  - D. All of the above
3. Sri Lanka is separated from India by a narrow channel of sea formed by the \_\_\_\_\_.
  - A. Palk Strait
  - B. Gulf of Mannar
  - C. Elephanta Caves
  - D. Both A and B
4. What was the primary objective of the 13th Amendment to Sri Lanka's Constitution?
  - A. To declare Tamil as the national language of Sri Lanka
  - B. To abolish the provincial councils in Sri Lanka
  - C. To provide for devolution of powers to provincial governments
  - D. To grant independence to Northern Sri Lanka

## 2. Supreme Court finds Tamil Nadu Governor's conduct arbitrary, puts Governors on the clock

- The Supreme Court in a judgment found Tamil Nadu Governor R.N. Ravi no “friend, guide or philosopher” to the State for having sat for years on 10 crucial Bills, only to refer them to the President in a sleight of hand soon after they were repassed by the State Legislature and on learning his conduct was under judicial scrutiny.
- A Bench of Justices J.B. Pardiwala and R. Mahadevan said Governor Ravi acted illegally like a “roadblock” by delaying action on the Bills sent to him for consent by the State Legislature under Article 200 of the Constitution.
- “Once a Bill is presented to the Governor, he is under a Constitutional obligation to opt for one of the three choices — assent, withholding of assent and reservation of the Bills for consideration by the President — under Article 200.
- The phrase ‘as soon as possible’ permeates Article 200 with a sense of expediency and does not allow Governors to sit on Bills and exercise pocket veto over them,” Justice Pardiwala, who authored the judgment, observed.
- In a significant move, the court fixed maximum time limits of one to three months for Governors to take a call on Bills.
- Justice Pardiwala said Governors must be put on the clock as the Constitutional significance of Article 200 and federal polity required that their conduct answer to “determinable judicial standards”. Any failure to comply with the timelines would invite judicial review of the Governor concerned, the court warned.
- The judgment explained that under the first proviso of Article 200, if the Governor opted to withhold assent, he had to return the Bill to the Assembly ‘as soon as possible’ with a ‘message’ to reconsider the proposed law or specific provisions or even suggesting amendments.
- The Tamil Nadu Governor had withheld consent to the 10 Bills without assigning any reasons as required under Article 200 of the Constitution.
- Justice Pardiwala declared that Governors had no such “absolute or pocket veto”. “Governors cannot withhold assent simpliciter the court declared.
- If the House passed the Bill again and presented it to a Governor, the latter would be bound to grant consent without exercising personal discretion, the court pronounced.
- “If a Bill is presented after reconsideration in accordance with the first proviso, the Governor must grant consent forthwith or within a maximum of one month,” the court dictated.
- The Tamil Nadu Assembly had repassed the 10 Bills in a special session held on November 18, 2023 without making any amendments, and returned them to the Governor for his consent again.
- The Governor, this time, had sat on the “re-passed” Bills indefinitely, only to reserve them for the consideration of the President on November 28, 2023 after the State approached the Supreme Court.
- The Supreme Court declared the Governor’s conduct arbitrary, non-est (non-existent) and erroneous in law.

## Supreme Court prescribes time limits for Governors to act on Bills

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- The Supreme Court prescribed time limits for Governors to act on Bills.
- This decision came after the top court came down heavily on Tamil Nadu Governor R.N. Ravi and said reservation of 10 Bills by him for consideration of the President was “erroneous in law”.
- A Bench of Justices J.B. Pardiwala and R. Mahadevan said that under Article 200 of the Constitution, the Governor does not possess any discretion and has to mandatorily act on the aid and advice of the council of ministers.
- Article 200 of the Constitution deals with assent to Bills.

### Timelines prescribed for Governors when Bills are presented to them:

- In case of withholding assent, one month
- In case of withholding assent contrary to advise of the State Cabinet, three months
- In case of Bills presented for reconsideration by Governors, one month
- The Bench said the Governor cannot withhold assent and adopt concept of absolute veto or pocket veto.
- It said the Governor is obligated to adopt one course of action — give assent to Bills, withhold assent and reserve for consideration of the president.
- The Bench said the Governor must assent to the Bills produced before him in the second round, and the only exception is in case the Bill in the second round is different from the first one.

### Pocket Veto:

- The pocket veto is a special type of veto power exercised by the President of a country, most notably in the United States and India, under specific circumstances. **Pocket Veto in India:**
- Under Article 111 of the Indian Constitution:
  - When a bill is passed by both Houses of Parliament, it is sent to the President for assent.
- The President has three options:
  - Give assent to the bill.
  - Withhold assent (called an absolute veto).
  - Return the bill (except money bills) for reconsideration (called a suspensive veto).

### What is Pocket Veto?

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- Pocket veto is when the President neither signs nor returns the bill, and keeps it pending indefinitely.
- The Indian Constitution does not prescribe any time limit within which the President must act on a bill.
- This gives the President the power to effectively “kill” the bill by inaction.

### Example:

- The most famous case of pocket veto in India was when President Zail Singh used it in 1986 to withhold his assent to the Postal Bill, which he considered unconstitutional.

### Governors in India

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- In India, Governors are the constitutional heads of the states, similar to how the President is the constitutional head of the country.

### Role of a Governor:

- Acts as the nominal head of a state.

- Performs functions based on the advice of the Chief Minister and the Council of Ministers.
- Has executive, legislative, and discretionary powers similar to those of the President at the central level.

### **Constitutional Provisions:**

- Article 153 to 162 of the Indian Constitution deal with the Governor.
- A Governor is appointed by the President of India.
- Term: 5 years (can be reappointed or removed earlier by the President).

### **Powers of a Governor:**

#### **1. Executive Powers:**

- Appoints the Chief Minister and, on their advice, other ministers.
- Appoints the Advocate General and State Election Commissioners.
- Has power over state public service commissions.

#### **2. Legislative Powers:**

- Can summon, prorogue, and dissolve the State Legislature.
- Gives assent to bills or withholds assent or reserves them for the President.
- Can promulgate ordinances when the legislature is not in session.

#### **3. Judicial Powers:**

- Can grant pardons, reprieves, respites, or remissions under Article 161 for offenses against state laws.

#### **4. Discretionary Powers:**

- In case of a hung assembly or President's Rule, the Governor can exercise discretion.

## **QUESTIONS**

### **Solve the multiple choice questions:**

- What is the maximum time limit now prescribed by the Supreme Court for Governors to act on Bills presented to them for reconsideration?
  - Two weeks
  - One month
  - Three months
  - Six months
- According to the Supreme Court's 2025 judgment, under Article 200 of the Constitution, which of the following actions by a Governor is deemed unconstitutional if exercised after the State Legislature repasses a Bill without amendments?
  - Reserving the repassed Bill for Presidential consideration
  - Granting assent to the Bill after six months
  - Returning the Bill with suggested amendments
  - Withholding assent without offering a message
- As per the 2025 ruling, which specific constitutional standard did the Supreme Court invoke to justify setting timelines for Governors' actions under Article 200?
  - Cooperative Federalism Doctrine

- B. Principle of Reasonableness under Article 14
  - C. Judicially determinable standards in a federal polity
  - D. Basic Structure Doctrine
8. Which of the following statements best differentiates the Pocket Veto of the President from the conduct deemed unconstitutional by the Governor of Tamil Nadu, as per the 2025 judgment?
- A. The President's pocket veto is explicitly allowed by Article 111, whereas Governors have no such provision under Article 200.
  - B. Pocket veto is allowed only for money bills by the President, whereas Governors can use it for ordinary bills.
  - C. The Constitution prescribes a time limit for Governors under Article 200, but not for the President under Article 111.
  - D. The President is not bound by the advice of the Council of Ministers when using a pocket veto, while the Governor is.

## 3. Samudrayaan Mission

- According to the Ministry of Earth Science, the Samudrayaan Mission is expected to be realised by year 2026.
- In a big boost for India's ambitious Deep Ocean Mission, Union finance minister Nirmala Sitharaman has allocated Rs. 600 crore for the Samudrayaan project, under which scientists will be sent to the depths of the ocean in a specially-designed submersible to explore the ocean floor, including the country's continental shelf and exclusive economic zones.
- The earth sciences ministry, which is spearheading the mission, received an allocation of Rs. 3,649.8 crore in the budget, as against Rs. 3,064.8 crore in the ongoing fiscal year.
- India plans to send a manned-submersible, developed by the Chennai-based National Institute of Ocean Technology (NIOT), up to a depth of 500 metres in the ocean later this year, and gradually explore the seabed at the depth of 6,000 metres next year.
- The mission involves mapping of floors of deep oceans and development of technologies like a manned submersible, mining system for deep sea mining, sustainable utilisation of deep-sea bioresources, and developing engineering designs for offshore thermal energy-driven desalination plants.
- Human capacity will be developed in ocean biology and engineering through the translation of research into industrial applications.
- The Deep Ocean Mission aims to explore deep-oceanic resources and develop technologies for their sustainable use.
- The mission consists of six major themes, namely development of technologies for deep sea mining, manned submersible, and underwater robotics; development of ocean climate change advisory services; technological innovations for exploration and conservation of deepsea biodiversity; deep ocean survey and exploration; energy and freshwater from the ocean; and advanced marine station for ocean biology.

### What is Samudrayaan Mission?

- The mission is aimed at sending three personnel to 6000-metre depth in a vehicle called 'MATSYA 6000' for the exploration of deep-sea resources like minerals.

- 'MATSYA 6000' vehicle is being designed and developed by National Institute of Ocean Technology (NIOT), Chennai under Ministry of Earth Sciences.
- It has an endurance of 12 hours under normal operation and 96 hours in case of emergency for human safety.
- It is India's first unique manned ocean mission and is a part of the Rs. 6000-crores Deep Ocean Mission.

### Significance:

- The manned submersible will allow scientific personnel to observe and understand unexplored deep-sea areas by direct intervention.
- It will also boost the Central government's vision of 'New India' that highlights the Blue Economy as one of the ten core dimensions of growth.
- India has a unique maritime position, a 7517 km long coastline, which is home to nine coastal states and 1,382 islands.
- For India, with its three sides surrounded by the oceans and around 30% of the nation's population living in coastal areas and coastal regions play a major economic factor.
- It supports fisheries and aquaculture, tourism, livelihoods, and blue trade.

### What is the Deep Ocean Mission?

- It was approved in June 2021 by the Ministry of Earth Sciences.
- It aims to explore the deep ocean for resources, develop deep-sea technologies for sustainable use of ocean resources, and support the Blue Economy Initiatives of the Indian Government.
- The cost of the Mission has been estimated at Rs. 4,077 crores over a five-year period and will be implemented in phases.

### What are the Other Related Initiatives?

- **India-Norway Task Force on Blue Economy for Sustainable Development:** It was inaugurated jointly by both the countries in 2020 to develop and follow up joint initiatives between the two countries.
- **Sagarmala Project:** The Sagarmala project is the strategic initiative for port-led development through the extensive use of IT enabled services for modernization of ports.
- **O-SMART:** India has an umbrella scheme by the name of O-SMART which aims at regulated use of oceans, marine resources for sustainable development.
- **Integrated Coastal Zone Management:** It focuses on conservation of coastal and marine resources, and improving livelihood opportunities for coastal communities etc.
- **National Fisheries Policy:** India has a National Fisheries policy for promoting 'Blue Growth Initiative' which focuses on sustainable utilization of fisheries wealth from marine and other aquatic resources.

### India-Norway Task Force on Blue Economy for Sustainable Development

- The purpose of the task force is to develop and follow up joint initiatives between the two countries.
- It also intends to mobilise relevant stakeholders from both Norway and India at the highest level, and ensure continued commitment and progress across ministries and agencies.
- Norway is an expert on the subject of the Ocean Economy as 70% of Norway's export is from Norway's maritime industry.
- Starting the bilateral ocean dialogue has added a new dimension in India-Norway relations and will help India to understand the know-how of the maritime industry.

- India and Norway have been enjoying a cordial and friendly relationship since the establishment of relations in 1947.
- The two countries respect each other for their commonly shared values such as democracy, human rights and rule of law. In recent years, both countries have been increasing their engagements in the field of trade and technology.
- Norway has supported India's membership to export control regimes the Missile Technology Control Regime (MTCR), the Wassenaar Arrangement (WA) and the Australia Group (AG).
- India has signed a Double Taxation Avoidance Agreement (DTAA) with Norway in 1986 which was revised in February 2011.
- Total bilateral trade between India and Norway stands around \$1.1 billion in 2015- 16.
- Three Arctic Missions from India have so far visited Norway, in 2007, 2008 and 2009. India's Polar Research Station "Himadri" is located at Ny Alesund, Spitsbergen Island, Norway.

## Blue Economy

- The concept was introduced by Gunter Pauli in his 2010 book- "The Blue Economy: 10 years, 100 innovations, 100 million jobs".
- It is the sustainable use of ocean resources for economic growth, improved livelihoods and jobs, and ocean ecosystem health.
- It comprises renewable energy, fisheries, maritime transport, tourism, climate change, waste management.
- It is also reflected in Sustainable Development Goal (SDG 14), which calls to conserve and sustainably use the oceans, seas and marine resources for sustainable development.
- Blue Economy can help to generate livelihoods, to achieve energy security, to build ecological resilience and to improve living standards of coastal communities.
- India has a long coastline of 7,517 km covering nine states and two union territories – with an Exclusive Economic Zone (EEZ) of 2.02 mn. sq.km.

## Sagarmala Project

- The Sagarmala Programme is an initiative by the Government of India to enhance the performance of the country's logistics sector.
- The programme envisages unlocking the potential of waterways and the coastline to minimize infrastructural investments required to meet these targets.
- It entails investing ₹8.5 trillion (equivalent to ₹11 trillion, US\$140 billion or €140 billion in 2023) (2018) to set up new mega ports, modernizing India's existing ports, developing of 14 Coastal Economic Zones (CEZs) and Coastal Economic Units, enhancing port connectivity via road, rail, multi-modal logistics parks, pipelines & waterways and promoting coastal community development, with the aim of boosting merchandise exports by US\$110 billion and generating around 10 million direct and indirect jobs.
- The Sagarmala Programme is the flagship programme of the Ministry of Ports, Shipping and Waterways to promote port-led development in the country by exploiting India's 7,517 km long coastline, 14,500 km of potentially navigable waterways and its strategic location on key international maritime trade routes.
- Sagarmala aims to modernize India's Ports, so that port-led development can be augmented and coastlines can be developed to contribute to India's growth.
- It also aims at "transforming the existing Ports into modern world-class Ports and integrate the development of the Ports, the Industrial clusters and hinterland and efficient evacuation systems through road, rail, inland and coastal waterways resulting in Ports becoming the drivers of economic activity in coastal areas."

## O-SMART

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- The scheme encompasses a total of 16 sub-projects addressing ocean development activities such as Services, Technology, Resources, Observations and Science.
- The services rendered under the O-SMART will provide economic benefits to a number of user communities in the coastal and ocean sectors, namely, fisheries, offshore industry, coastal states, Defence, Shipping, Ports etc.
- The objectives of O-SMART (Ocean Services, Modelling, Applications, Resources and Technology) scheme of Ministry of Earth Sciences (MoES), Govt. of India are
- To generate and regularly update information on Marine Living Resources and their relationship with the physical environment in the Indian Exclusive Economic Zone (EEZ),
- To periodically monitor levels of sea water pollutants for health assessment of coastal waters of India, to develop shoreline change maps for assessment of coastal erosion due to natural and anthropogenic activities,
- To develop a wide range of state-of-the art ocean observation systems for acquisition of real-time data from the seas around India,
- To generate and disseminate a suite of user-oriented ocean information, advisories, warnings, data and data products for the benefit of society,
- To develop high resolution models for ocean forecast and reanalysis system,
- To develop algorithms for validation of satellite data for coastal research and to monitor changes in the coastal research,
- Acquisition of 2 Coastal Research Vessels (CRVs) as replacement of 2 old CRVs for coastal pollution monitoring, testing of various underwater components and technology demonstration,
- To develop technologies to tap the marine bio resources,
- To develop technologies generating freshwater and energy from ocean,
- To develop underwater vehicles and technologies,
- Establishment of Ballast water treatment facility,
- To support operation and maintenance of 5 Research vessels for ocean survey/monitoring/technology demonstration programmes,
- Establishment of state of the art sea front facility to cater to the testing and sea trial activities of ocean technology,
- To carryout exploration of Polymetallic Nodules (MPN) from water depth of 5500 m in site of 75000 sq.km allotted to India by United Nations in Central Indian Ocean Basin, to carryout investigations of gas hydrates,
- Exploration of polymetallic sulphides near Rodrigues Triple junction in 10000 sq. km of area allotted to India in International waters by International Seabed Authority/UN and, Submission of India's claim over continental shelf extending beyond the Exclusive Economic Zone supported by scientific data, and Topographic survey of EEZ of India.

## Integrated coastal zone management

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- Integrated coastal zone management (ICZM), integrated coastal management (ICM), or integrated coastal planning is a coastal management process for the management of the coast using an integrated approach, regarding all aspects of the coastal zone, including geographical and political boundaries, in an attempt to achieve sustainability.
- This concept was born in 1992 during the Earth Summit of Rio de Janeiro.

- The Integrated Coastal Zone Management (ICZM) is a key element for the sustainable development of coastal zones.
- However this recent notion may not be adapted to all cases.
- The natural disasters Sumatra earthquake and the Indian Ocean tsunami have made a lot of impact on the coastal environment and also the stakeholder's perception on mitigation and management of coastal hazards.
- The dynamic processes that occur within the coastal zones produce diverse and productive ecosystems which have been of great importance historically for human populations.
- Coastal margins equate to only 8% of the world's surface area but provide 25% of global productivity.
- Stress on this environment comes with approximately 70% of the world's population being within a day's walk of the coast.
- Two-thirds of the world's cities occur on the coast.
- Valuable resources such as fish and minerals are considered to be common property and are in high demand for coastal dwellers for subsistence use, recreation and economic development.
- Through the perception of common property, these resources have been subjected to intensive and specific exploitation.
- For example; 90% of the world's fish harvest comes from within national exclusive economic zones, most of which are within the sight of shore.
- This type of practice has led to a problem that has cumulative effects.
- The addition of other activities adds to the strain placed on this environment.
- As a whole, human activity in the coastal zone generally degrades the systems by taking unsustainable quantities of resources.
- The effects are further exacerbated with the input of pollutant wastes. This provides the need for management.
- Due to the complex nature of human activity in this zone a holistic approach is required to obtain a sustainable outcome.

## QUESTIONS

**Solve the multiple choice questions:**

9. The 'MATSYA 6000' submersible, part of India's Samudrayaan Mission, is primarily designed for:
  - A. Launching underwater satellites for marine data
  - B. Extracting oil from deep-sea reserves
  - C. Manned exploration of deep-sea resources up to 6000 meters
  - D. Mapping the Exclusive Economic Zone (EEZ) boundaries
10. Which of the following statements about the Samudrayaan Mission is incorrect?
  - A. It supports India's Blue Economy vision as part of the Deep Ocean Mission.
  - B. The MATSYA 6000 has a 96-hour emergency life support system.
  - C. It is being developed by the Indian Navy under the Ministry of Defence.
  - D. It enables direct observation of deep-sea ecosystems.

## 4. South China Sea dispute

- The South China Sea is situated just south of the Chinese mainland and is bordered by the countries of Brunei, China, Indonesia, Malaysia, Philippines, Taiwan and Vietnam.
- The countries have bickered over territorial control in the sea for centuries, but in recent years tensions have soared to new heights.
- The South China Sea is one of the most strategically critical maritime areas (more on this later) and China eyes its control to assert more power over the region.
- In 1947, the country, under the rule of the nationalist Kuomintang party, issued a map with the so-called “nine-dash line” (for a detailed explanation, scroll down). The line essentially encircles Beijing’s claimed waters and islands of the South China Sea — as much as 90% of the sea has been claimed by China. The line continued to appear in the official maps even after the Chinese Communist Party (CCP) came to power.
- In the past few years, the country has also tried to stop other nations from conducting any military or economic operation without its consent, saying the sea falls under its Exclusive Economic Zone (EEZ).
- China’s sweeping claims, however, have been widely contested by other countries. In response, China has physically increased the size of islands or created new islands altogether in the sea, according to the Council on Foreign Relations (CFR).
- “In addition to piling sand onto existing reefs, China has constructed ports, military installations, and airstrips—particularly in the Paracel and Spratly Islands, where it has twenty and seven outposts, respectively. China has militarised Woody Island by deploying fighter jets, cruise missiles, and a radar system,” it added.
- To challenge China’s assertive territorial claims and protect its own political and economic interests, the US has intervened in the matters. It has not only increased its military activity and naval presence in South Asia but also provided weapons and aid to China’s opponents.

### What’s the importance of the South China Sea?

- There are 11 billion barrels of oil and 190 trillion cubic feet of natural gas in deposits under the South China Sea, according to the estimates of the United States Energy Information Agency.
- Moreover, the sea is home to rich fishing grounds — a major source of income for millions of people across the region. The BBC reported that more than half of the world’s fishing vessels operate in this area.
- Most significantly, the sea is a crucial trade route. “The United Nations Conference on Trade and Development estimates that over 21% of global trade, amounting to \$3.37 trillion, transited through these waters in 2016,” the news outlet added.

### What is the ‘nine-dash line’?

- As mentioned before, the nine-dash line demarcates China’s territorial claims in the sea on Chinese maps.
- It was initially the “eleven-dash line” but in 1953, the CCP-led government removed “the portion encompassing the Gulf of Tonkin, simplifying the border to nine dashes,”.
- The line runs as far as 2,000 km from the Chinese mainland to within a few hundred kilometres of the Philippines, Malaysia and Vietnam.

- But on what parameters the line has been drawn? China's claim on the waters and islands within the boundary is based on its "historical maritime rights". However, the country has never clearly stated the line coordinates and the line runs many miles beyond what is allowed under the United Nations treaty on maritime territorial issues, which China has signed.
- Take the example of the Scarborough Shoal, also known as Huangyan Island.
- While it comes under the Philippines' EEZ, Beijing claims that the records show "China's sailors discovered Huangyan Island 2,000 years ago and cite extensive records of visits, mapping expeditions and habitation of the shoal from the Song Dynasty (960-1279 AD) right through to the modern period,".
- Similarly, China says it has centuries-old ties with the Paracel and Spratly island chains as they were once an integral part of the Chinese nation. But Vietnam disputes the claim, saying it has actively ruled over both the Paracels and the Spratlys since the 17<sup>th</sup> Century — and has the documents to prove it.
- In 2016, after the Philippines took China to an international tribunal pertaining to the dispute over the Scarborough Shoal, the tribunal in its ruling largely rejected the nine-dash line and said, "China had broken international law by endangering Philippine ships and damaging the marine environment,".
- Although the tribunal's judgement was binding, there was no enforcement mechanism. China boycotted the proceedings, claiming the tribunal had no jurisdiction and that it would ignore any decision.

### How can the dispute be resolved?

- Some believed that ASEAN (the Association of Southeast Asian Nations) — a 10-member regional grouping that comprises Thailand, Indonesia, Malaysia, the Philippines, Singapore, Brunei, Laos, Vietnam, Myanmar and Cambodia — might find a way to tackle the issue. Due to internal conflicts, the group has largely failed to do so.
- Therefore, there is a palpable fear that the South China Sea dispute can soon become the next global conflict, with grave consequences.
- "The failure of Chinese and Southeast Asian leaders to resolve the disputes by diplomatic means could also undermine international laws governing maritime disputes and encourage destabilising arms buildups,".

### ASEAN

- ASEAN, an abbreviation for the Association of Southeast Asian Nations, is a political and economic union of 10 states in Southeast Asia.
- Together, its member states represent a population of over 600 million over a land area of 4.5 million km<sup>2</sup> (1.7 million sq mi).
- The bloc generated a purchasing power parity (PPP) gross domestic product (GDP) of around US\$10.2 trillion in 2022, constituting approximately 6.5% of global GDP (PPP).
- ASEAN member states include some of the fastest growing economies in the world.
- The primary objectives as stated by the association are "to accelerate economic growth, social progress and cultural development in the region", and "to promote regional peace and stability through abiding respect for justice and the rule of law in the relationship among countries in the region and adherence to the principles of the United Nations Charter."
- The bloc has broadened its objectives beyond economic and social spheres, aiming to emulate the European Union by establishing a shared security regime.
- ASEAN engages with other supranational entities in the Asia-Pacific region and beyond: it is a major partner of the UN, SCO, PA, GCC, MERCOSUR, CELAC, and ECO, It hosts diplomatic missions throughout the world, maintaining a global network of relationships, and is considered by many to be a global powerhouse, and even the central forum for cooperation in the region. Its success has become the driving force of some of the largest trade blocs in history, including APEC and RCEP.

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### Expansion

- On 7 January 1984, Brunei became ASEAN’s sixth member and on 28 July 1995, following the end of the Cold War, Vietnam joined as the seventh member.
- Laos and Myanmar (formerly Burma) joined two years later on 23 July 1997.
- Cambodia was to join at the same time as Laos and Myanmar, but a coup in 1997 and other internal instability delayed its entry.
- It then joined on 30 April 1999 following the stabilization of its government.
- In 2006, ASEAN was given observer status at the United Nations General Assembly.
- In response, the organization awarded the status of “dialogue partner” to the UN.

### Scarborough Shoal

- Scarborough Shoal, also known as Bajo de Masinloc Panatag Shoal Huangyan Island in an atoll administered by China in the South China Sea.
- It is located between Macclesfield Bank to the west and Luzon, its nearest landmass (220 kilometres (119 nmi) away), to the east.
- The atoll is a disputed territory claimed by the Republic of the Philippines through the 1734 Velarde map, while the People’s Republic of China and the Republic of China (Taiwan) claim it through the disputed nine-dash line (originally an eleven-dash line that included waters in the Gulf of Tonkin).
- The atoll’s status is often discussed in conjunction with other territorial disputes in the South China Sea such as those involving the Spratly Islands, and the 2012 Scarborough Shoal standoff.
- It was administered by the Philippines as part of its Zambales province until 2012, when a standoff was initiated by China through the use of warships against fishing boats, resulting in effective capture by the Chinese maritime forces.

- In 2013, the Philippines solely filed an international case against China in the arbitration court in The Hague, Netherlands.
- In 2016, the court declared that China's so-called nine-dash line claim in the entire South China Sea was invalid, while upholding the sovereign rights of the Philippines in the area.
- China rejected the court's decision, sending more warships in Scarborough Shoal and the Spratly Islands, while a multitude of nations backed the Tribunal's ruling including the claimants to the area such as Malaysia, the Philippines, and Vietnam.
- The atoll was named by Captain Philip D'Auvergne, whose East India Company East Indiaman Scarborough grounded on one of the rocks on 12 September 1784, before sailing on to China, although it already had a Spanish name recorded in the 1734 Velarde map of Spanish Philippines.

## QUESTIONS

**Solve the multiple choice questions:**

- Which of the following Island groups is most geographically spread out and contains features claimed by multiple countries?
  - Paracel Islands
  - Scarborough Shoal
  - Spratly Islands
  - Macclesfield Bank
- Which of the following statements is/are true regarding the United Nations Convention on the Law of the Sea (UNCLOS)?
  - It is an international agreement that establishes the legal framework for marine and maritime activities.
  - It divides marine areas into three main zones.
  - It is the only international convention which stipulates a framework for state jurisdiction in maritime spaces.

Select the correct answer using codes given below:

  - 1 only
  - 1 and 3 only
  - 1 and 2 only
  - 1, 2 and 3
- Which of the following statements are True regarding the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement?
  - Union Cabinet has approved India to sign the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement, also known as the High Seas Treaty.
  - High seas are areas outside the national jurisdiction of any country.
  - Typically, national jurisdictions extend up to 200 nautical miles (370 km) from the coastline, an area called Exclusive Economic Zone (EEZ).
  - High Seas constitute about roughly two-thirds, of the total ocean area and are considered global commons.

5. It will be an international legally binding treaty after it enters force 120 days after 60 countries ratify it.

How many of the above statements are True?

- A. Only two statements
- B. Only three statements
- C. Only four statements
- D. All of the above

## 5. Indus Waters Treaty

- The Neutral Expert (NE) appointed under terms of the Indus Water Treaty (IWT), 1960, decided that he was “competent” to decide on differences between India and Pakistan on the design of hydroelectric projects built on the Indus Treaty-rivers. India, in a statement, “welcomed” the move.
- The decision by Michel Lino, the World Bank appointed NE however, does not help resolve a demand by India in January 2023 to renegotiate the IWT but only keeps alive the differences between the two countries on the dispute resolution mechanism, laid out under the terms of the IWT.

### History

- The Indus Water Treaty (IWT) is a water-distribution treaty between India and Pakistan, arranged and negotiated by the World Bank, to use the water available in the Indus River and its tributaries.
- It was signed in Karachi on 19 September 1960 by then Indian Prime Minister Jawaharlal Nehru and then Pakistani president Ayub Khan.
- The Treaty gives control over the waters of the three “eastern rivers” — the Beas, Ravi and Sutlej with a mean annual flow of 41 billion m<sup>3</sup> (33 million acre·ft) — to India, while control over the waters of the three “western rivers” — the Indus, Chenab and Jhelum with a mean annual flow of 99 billion m<sup>3</sup> — to Pakistan.
- India has about 20% of the total water carried by the Indus system while Pakistan has 80%.
- The treaty allows India to use the western river waters for limited irrigation use and unlimited non-consumptive use for such applications as power generation, navigation, floating of property, fish culture, etc.
- It lays down detailed regulations for India in building projects over the western rivers.
- The preamble of the treaty recognises the rights and obligations of each country in the optimum use of water from the Indus system in a spirit of goodwill, friendship and cooperation.
- This has not reduced the Pakistani fears that India could potentially create floods or droughts in Pakistan, especially in times of war.
- In 1948, the water rights of the river system were the focus of an Indo-Pakistani water dispute.
- Since the ratification of the treaty in 1960, India and Pakistan have not engaged in any water wars, despite engaging in several military conflicts.
- Most disagreements and disputes have been settled via legal procedures, provided for within the framework of the treaty.

- The Indus Waters Treaty is considered one of the most successful water sharing endeavours in the world even though analysts acknowledge the need to update certain technical specifications and expand the scope of the agreement to address climate change.
- The waters of the Indus system of rivers begin mainly in Tibet and the Himalayan Mountains in the states of Himachal Pradesh and Jammu and Kashmir.
- They flow through the states of Punjab and Sindh before emptying into the Arabian Sea south of Karachi and Kori Creek in Gujarat.
- The average annual available water resource in Pakistan is 218 billion m<sup>3</sup>.
- Where once there was only a narrow strip of irrigated land along these rivers, developments over the last century have created a large network of canals and storage facilities that provide water for more than 47 million acres (190,000 km<sup>2</sup>) in Pakistan alone by 2009, one of the largest irrigated area of any one river system.
- The partition of British India created a conflict over the waters of the Indus basin.
- The newly formed states were at odds over how to share and manage what was essentially a cohesive and unitary network of irrigation.
- Furthermore, the geography of partition was such that the Source Rivers of the Indus basin were in India.
- Pakistan felt its livelihood threatened by the prospect of Indian control over the tributaries that fed water into the Pakistani portion of the basin.
- Where India certainly had its own ambitions for the profitable development of the basin, Pakistan felt acutely threatened by a conflict over the main source of water for its cultivable land.
- During the first years of partition, the waters of the Indus were apportioned by the Inter-Dominion Accord of May 4, 1948.
- This accord required India to release sufficient water through existing canals to the Pakistani regions of the basin in return for annual payments from the government of Pakistan.
- The accord was meant to meet immediate requirements and was followed by negotiations for a more permanent solution.
- However, neither side was willing to compromise their respective positions and negotiations reached a stalemate.
- From the Indian point of view, there was nothing that Pakistan could do to force India to divert, from any of its schemes, the river water into the irrigation canals of Pakistan.
- Pakistan wanted to take the matter at that time to the International Court of Justice, but India refused, arguing that the conflict required a bilateral resolution.

### Several reasons to renegotiate

- Calls for amending or renegotiating the Indus Waters Treaty are being made for more than two decades now, on both sides.
- Despite being awarded nearly 80 per cent of the water flow in these rivers, Pakistan has always maintained that it has been treated unfairly, arguing that it should have been allotted some share of the Ravi, Sutlej and Beas rivers as well.
- The Treaty gave India full rights over the waters of these three 'eastern' rivers, while most of the flows in the three 'western' rivers, Jhelum, Chenab and Indus, were meant for Pakistan. The western rivers have far greater volumes flowing in them.
- But this is not the only reason why Pakistani voices want the Treaty renegotiated.

- Experts on both sides agree that there have been significant changes since the Treaty came into being in 1960, and it needs to be updated. The impacts of climate change and the advancement in water storage and management technologies are cited as some of the most compelling reasons to renegotiate.
- Climate change concerns bother Pakistan more.
- One of the consequences of climate change has been a decrease in the overall flows in the Indus river system.
- The decline thus far is just about 5 per cent from 1960, but is expected to worsen rapidly.
- On the other hand, Pakistan's population has increased by six to seven times since Independence, and is still growing at a fast pace. That means increased demand for water, and thus increased dependence on these rivers.

### Accommodating new technologies

- The Indus Waters Treaty is very prescriptive in what can or cannot be done on the rivers by India, the upper riparian state.
- But dams or reservoirs are very different from the ones in the 1960s. Whenever India has tried to use newer designs and technologies, Pakistan has objected, like with the Baglihar dam.
- The dispute over Baglihar dam had to be referred to a neutral expert who ruled in favour of India, arguing that the new technology, even if not fully in accordance with the Treaty, would prolong the life of the project and thus was in everyone's interest.
- Making the Treaty non-prescriptive on design and technology could also help in mitigating the adverse impacts of climate change on water availability in the Indus river system.
- Other reasons include the need for joint management, greater flexibility in utilisation of waters, and adoption of basin-wise approach in the management of the river waters. Some Pakistani voices also hope that a renegotiation of the Treaty would allow China to become a party, which would then neutralise India's advantage. The Indus basin extends to China and Afghanistan as well.

### Strategic move

- These reasons notwithstanding, it would be naïve to assume that India's proposal to modify the Treaty is driven by anything other than strategic interest.
- Despite its reputation as one of the most successful water-sharing agreements between countries, the Indus Waters Treaty has kept both India and Pakistan dissatisfied for six decades.
- However, the Treaty has been largely absent from public discourse after that, unlike in Pakistan, where its perceived injustice is part of everyday conversations.
- However, the September 2016 Uri attack changed things in India, triggering a public clamour for weaponising the Treaty.
- Being the upper riparian state, India has a distinctive advantage, with the power to inflict damage entirely one-sided.
- Indian governments until then had resisted the temptation to use the Treaty as a strategic tool against Pakistan.
- But in the aftermath of the attack, Prime Minister Narendra Modi's 'blood and water cannot flow together' remark, and the temporary suspension of routine meetings of Indus Commissioners, signalled a departure. The recent notice to Pakistan is another step in the same direction.
- In a way, this is another Balakot moment.
- The notice is a message to Pakistan that India would be unpredictable in its dealings with it, and would not shy away from escalation. Considering Pakistan's desperate dependence on the Indus Basin Rivers, this in itself could be extremely unsettling.

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- It was signed in Karachi on 19 September 1960 by then Indian Prime Minister Jawaharlal Nehru and then Pakistani president Ayub Khan.
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- This has not reduced the Pakistani fears that India could potentially create floods or droughts in Pakistan, especially in times of war.
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- Since the ratification of the treaty in 1960, India and Pakistan have not engaged in any water wars, despite engaging in several military conflicts.
- Most disagreements and disputes have been settled via legal procedures, provided for within the framework of the treaty.
- The Indus Waters Treaty is considered one of the most successful water sharing endeavours in the world even though analysts acknowledge the need to update certain technical specifications and expand the scope of the agreement to address climate change.

### Kishanganga Hydroelectric Project (KHEP)

- The Kishanganga Hydroelectric Project (KHEP) is a 330 MW run-of-the-river hydroelectric power plant located in the Bandipora district of Jammu and Kashmir, India.
- Developed by NHPC Limited, the project diverts water from the Kishanganga River (known as the Neelum River in Pakistan) through a 23.2 km tunnel to generate electricity before releasing it into the Jhelum River basin.

### Key Features

- **Dam Type:** Concrete-face rock-fill
- **Dam Height:** 37 meters
- **Hydraulic Head:** 646 meters
- **Turbines:** 3 × 110 MW Pelton-type
- **Annual Generation:** Approximately 1,713 million kWh
- **Commissioned:** May 2018
- **Cost:** ₹5,783.17 crore (approximately \$864 million USD in 2016)

### Legal and Diplomatic Dispute

- The project became a focal point of a legal dispute between India and Pakistan under the Indus Waters Treaty (IWT). Pakistan contended that the diversion of water would reduce downstream flow, affecting its Neelum-Jhelum Hydropower Plant.

- In 2013, the Permanent Court of Arbitration ruled that India could proceed with the project but must maintain a minimum environmental flow of 9 cubic meters per second downstream to Pakistan.

## Environmental and Local Concerns

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- Local communities in Bandipora raised concerns about environmental degradation and pollution during the construction phase.
- Studies indicated chemical disturbances in the water, rendering it unsuitable for consumption or washing.

## Strategic Importance

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- The KHEP enhances India's hydroelectric capacity and provides strategic control over water resources in the region.
- The diverted water also benefits downstream projects like the Lower Jhelum (105 MW) and Uri (720 MW) hydropower plants.
- The Kishanganga Hydroelectric Project exemplifies the complex interplay between energy development, environmental considerations, and international water treaties in South Asia.

## Rattle Hydroelectric Project

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- The Rattle Hydroelectric Project is a hydroelectric facility located in the state of Jammu and Kashmir, India, on the Chenab River in the Kishtwar district. It is a significant part of India's hydropower development strategy in the Himalayan region.
  - **Location:** Kishtwar district, Jammu and Kashmir, India
  - **River:** Chenab River
  - **Capacity:** 850 megawatts (MW)
  - **Type:** Run-of-the-river hydroelectric project
  - **Developer:** Initially developed as a private project by GVK Group, but later taken over by a joint venture between NHPC Limited (National Hydroelectric Power Corporation) and JKSPDC (Jammu and Kashmir State Power Development Corporation).
  - **Joint Venture Name:** Ratle Hydroelectric Power Corporation Limited (RHPCL)
- **Ownership:**
  - NHPC: 51%
  - JKSPDC: 49%
- **Timeline and Background:**
  - The project was conceived in 2010 and awarded to GVK Group.
  - Due to various delays including local opposition and legal issues, the project was stalled.
  - In 2021, the Indian government approved the revival of the project with central assistance and creation of RHPCL.
  - The foundation stone was laid by Prime Minister Narendra Modi in April 2022.
- **Strategic and Environmental Significance:**
  - Boosts power generation in the union territory of Jammu & Kashmir.
  - Helps in flood control, irrigation, and socio-economic development of the region.
  - Part of India's push for clean and renewable energy sources.
  - It is also important in the context of Indus Waters Treaty, as it utilizes water from the Chenab, a river allocated to Pakistan under the treaty.

## QUESTIONS

Solve the multiple choice questions:

14. What was the role of the Inter-Dominion Accord of May 4, 1948, in the context of the Indus water dispute?
- It permanently divided the Indus Rivers equally between India and Pakistan.
  - It required Pakistan to give full control of western rivers to India.
  - It was a temporary solution that allowed India to release water to Pakistan in exchange for payment.
  - It was an international agreement enforced by the World Bank.
15. Which of the following statements are True regarding the Indus Water Treaty (IWT)?
- It is a water-distribution treaty between India and Pakistan, arranged and negotiated by the World Bank.
  - It was signed in Karachi on 19 September 1956 by then Indian Prime Minister Jawaharlal Nehru and then Pakistani president Ayub Khan.
  - The Treaty gives control over the waters of the three "eastern rivers" — the Beas, Ravi and Sutlej to India, while control over the waters of the three "western rivers" — the Indus, Chenab and Jhelum to Pakistan.
  - India has about 80% of the total water carried by the Indus system while Pakistan has 20%.

How many of the above statements are True?

- Only one statement
- Only two statements
- Only three statements
- All of the above

## 6. PM 2.5, Sulphur Dioxide, and more: What are the pollutants in our air, and how they impact health

- Rising pollution levels in north India have led to focus returning on the Air Quality Index (AQI) score, a measure of air pollution. Delhi, for instance, recorded an AQI score of more than 400.
- This puts the air in the 'severe' category, with anything beyond 100 considered to be a state of at least moderate pollution on the index.
- The AQI transforms complex air quality data of various pollutants into a single number for ease of understanding.
- The pollutants include PM 10, PM 2.5, Nitrogen Dioxide, Ozone, Carbon, etc.

### What is PM 10 and PM 2.5?

- These are extremely fine particulate matter (PM) particles, with the digits accompanying them referring to their diameter.

- So, PM 10 and PM 2.5 are smaller than 10 and 2.5 microns in their diameter, respectively.
- One micron is about a thousandth of a millimetre and this tiny size has a role to play in how they impact human health.
- The finer the particles are, the more difficult it gets to protect oneself from them.
- Due to their size, the PM 2.5 particles can easily bypass the nose and throat and can enter the circulatory system.
- The particles can also lead to chronic diseases such as asthma, heart attack, bronchitis and other respiratory problems.
- Byproducts of emissions from factories, vehicular pollution, construction activities and road dust, such particles are not dispersed and stay suspended in the air that we breathe.

### Nitrogen Dioxide (NO<sub>2</sub>)

- Nitrogen dioxide (NO<sub>2</sub>) gets in the air from the burning of fuel, with sources including emissions from vehicles and power plants.
- The United States Environmental Protection Agency (EPA) states that short-term exposure to high levels of NO<sub>2</sub> can aggravate respiratory diseases like asthma, and lead to other problems such as coughing or difficulty in breathing.
- Long-term exposure may also contribute to the development of asthma and could increase susceptibility to respiratory infections.
- Exposure to NO<sub>2</sub>, even for a short duration (between zero and seven days), leads to an increase in the number of emergency room visits by 53 per cent, according to a large study by AIIMS, Delhi.

### Ozone (O<sub>3</sub>)

- Ozone is a gas that is present in the upper layers of the atmosphere, protecting human health from the impact of the Sun's UV rays.
- However, surface-level ozone is among the most significant air pollutants. It is formed by the reaction of atmospheric pollutants in the presence of sunlight.
- "With increase in surface ozone levels, there is likelihood of an increase in risk of hospital admissions for Chronic Obstructive Pulmonary Diseases (COPD) and the number of cardiovascular and respiratory deaths."

### Sulphur Dioxide (SO<sub>2</sub>)

- According to the US government's Environment Protection Agency, the largest source of SO<sub>2</sub> in the atmosphere is the burning of fossil fuels by power plants and other industrial facilities.
- Additional sources are industrial processes and natural sources such as volcanoes.
- As with other gases, SO<sub>2</sub> exposure is harmful to the cardiovascular system and can lead to the development of respiratory illnesses. SO<sub>2</sub> can also react with other compounds to form particulate matter.
- "At high concentrations, gaseous SO<sub>x</sub> can harm trees and plants by damaging foliage and decreasing growth," EPA states.

### Ammonia (NH<sub>3</sub>)

- A 2017 NASA-funded study said that in India, "A broad increase in fertilizer use coupled with large contributions from livestock waste has resulted in the world's highest concentrations of atmospheric ammonia."
- "In the troposphere – the lowest, most dense part of the atmosphere where all weather takes place and where people live – ammonia gas reacts with nitric and sulfuric acids to form nitrate-containing particles."

- Those particles contribute to aerosol pollution that is damaging to human health.
- Ammonia gas can also fall back to Earth and enter lakes, streams and oceans, where it contributes to harmful algal blooms and “dead zones” with dangerously low oxygen levels.”.

### Lead (Pb)

- Lead is a naturally occurring toxic metal found in the Earth’s crust.
- But in increased quantities, exposure to it becomes extremely dangerous to health.
- Important sources of environmental contamination come from mining, smelting, manufacturing and even recycling activities, according to the WHO.
- Also, young children are particularly vulnerable to lead poisoning because they absorb four to five times as much ingested lead as adults from a given source.
- Children who survive severe lead poisoning may be left with permanent intellectual disability and behavioural disorders.
- At lower levels of exposure that cause no obvious symptoms, lead is now known to produce a spectrum of injury across multiple body systems,” the WHO notes.

### Carbon Monoxide (CO)

- A toxic, colourless and odourless gas, it is given off when fuel containing carbon, such as wood, coal and petrol, is burned.
- If CO levels are high enough, a person may become unconscious and die. Long-term exposure has been linked with an increased risk of heart disease.

## QUESTIONS

**Solve the multiple choice questions:**

**16.** In the cities of our country, which among the following atmospheric gases are normally considered in calculating the value of Air Quality Index?

1. Carbon dioxide
2. Carbon monoxide
3. Nitrogen dioxide
4. Sulfur dioxide
5. Methane

Select the correct answer using the code given below.

- A. 1, 2 and 3 only
- B. 2, 3 and 4 only
- C. 1, 4 and 5 only
- D. 1, 2, 3, 4 and 5

**17.** Which of the following statements about the Commission for Air Quality Management (CAQM) is INCORRECT?

- A. It has the power to issue binding directions to authorities and individuals.
- B. It functions as an advisory body under the Ministry of Environment, Forest and Climate Change.
- C. It is a statutory body established by an Act of Parliament in 2021.
- D. It can restrict activities and prepare guidelines to prevent and control air pollution.

18. Which of the following is **NOT** among the core powers or responsibilities of the CAQM?

- A. Imposing fines and criminal penalties independently without court approval
- B. Coordinating with states for air quality monitoring and mitigation
- C. Preparing codes and guidelines for air pollution prevention
- D. Investigating and conducting research related to air quality

## 7. European cities go climate neutral by 2030

- The EU is pushing for 100 cities including Paris, Madrid and Amsterdam to reach net-zero emissions by the end of the decade — far earlier than their national governments plan to get there.
- As governments across the world have promised to stop polluting carbon emissions by 2050, scores of European cities have pledged to get there by 2030 — just seven years from now.
- The European Union wants 100 cities — including capitals Paris, Madrid and Amsterdam — to be carbon neutral by the end of the decade. Berlin, which is not on the list, held a referendum in March on moving its target forward to 2030. Despite a slim majority in favor of the plans, too few people voted overall for the law to pass.
- Cities aiming to meet the target by 2030 would have to make unprecedented changes to the way their citizens move, live, eat and sleep. In sectors like transport and buildings, the technologies to do so exist. The pathway is much less clear for industry and agriculture.
- Supporters and scientists have highlighted that the shift to net-zero emissions by 2030 would quickly clean up the air, make streets safer and buildings more comfortable.
- “All those carbon dioxide emissions cause not just environmental problems, but they also limit our way of life,” said Julia Epp, a scientist at the Potsdam Institute for Climate Impact Research in Germany. “We just need a lot more ambition.”

### Why would cities hit net-zero emissions in 2030?

- To keep global temperatures from rising by more than 1.5 degrees Celsius (2.7 degrees Fahrenheit) — the target to which world leaders promised to try to limit global warming — humanity must cut pollution fast.
- The Intergovernmental Panel on Climate Change found that the world needs to cut carbon emissions to net-zero by the middle of the century.
- Net-zero means societies have to suck out as much carbon as they pump into the atmosphere.
- But technologies to remove carbon dioxide are limited and scientists are unsure how much they can absorb.
- Still, that finding has led more than 100 countries to set net-zero targets for around 2050. Pressure is also rising on rich countries who have polluted the most, particularly those in Europe and North America, to move faster. While 2050 is a global average, nearly all countries signed the Paris Agreement on Climate Change, which accepts that countries have “common but differentiated responsibilities.”
- Experts say cities are good targets for faster action because they pump out a disproportionate share of greenhouse gases — partly because they have more people and tend to be richer.

- Just 10 city regions in Europe are responsible for 7.5% of the continent's total carbon dioxide emissions, a 2022 study found. The 100 dirtiest cities are responsible for 20% of the emissions.
- European cities also have the wealth and technology to cut emissions quickly, said Epp. "Doing more — or doing anything — is always necessary and good because it will help us achieve our climate goals."

### How easy is net-zero by 2030?

- Still, bringing a city's emissions down to zero — or even close to it — is hard. In a sector like transport, officials could force out combustion engine cars, improve public transport and make streets easier to walk.
- But electrifying the energy supply may require changes that need regional or national support.
- "Moving to achieve this by 2030 will demand a quite profound mobilization," said Thomas Osdoba, who leads the EU's NetZero Cities program supporting 112 cities on their way to the target.
- The program helps members overcome structural, institutional and cultural barriers, with the idea that lessons from one can be applied to another. Because most cities have only just started, it is unclear how likely they are to succeed.
- This is a learning process driven by innovation, said Osdoba. "If a good number of cities are able to achieve the goal as specified — and a larger number demonstrate they are able to move much more quickly to the outcome, even if they do not quite make it by 2030 — I would call the mission a success."
- In some sectors, like heavy industry, technological solutions are some way off. Facilities to capture carbon and store it safely underground have not yet achieved the efficiency needed to clean up cement plants, for instance.
- That makes full decarbonization a challenge for more industrial cities.
- Port cities like Rotterdam, in the Netherlands, and Hamburg, in Germany will also struggle to clean up without help at a national or European level.

### Climate Neutral Now

- The Climate Neutral Now Initiative is one of several initiatives launched by the UNFCCC secretariat to increase climate action by engaging non-Party stakeholders (sub-national governments, companies, organizations, individuals).
- It was launched in 2015 based on a mandate to promote the voluntary use of carbon market mechanisms recognized under the Convention.
- It has evolved to become a much wider tool for awareness-raising, capacity building, partnership development, promoting and facilitating the estimation of carbon footprints, the reduction of those footprints, and voluntary compensation (offsetting).
- The Climate Neutral Now Initiative encourages and supports organizations and other interested stakeholders to act now in order to achieve a climate neutral world by 2050 as enshrined in the Paris Agreement.
- The initiative is NOT a certification scheme for its participants. It is a tool to promote additional voluntary action on climate, and to provide recognition for it.
- Claims of carbon neutrality, net zero or similar are out of the scope of Climate Neutral Now, even when participation in the initiative can help stakeholders advance in their path to achieve those certifications through suitable standards and processes.
- An organization can become a participant by signing the Climate Neutral Now Pledge, following the three steps (Measure, Reduce, Contribute) and reporting on its actions and achievements annually.

## QUESTIONS

Solve the multiple choice questions:

19. The Government of India has articulated and put across the concerns of developing countries at the 26<sup>th</sup> session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Glasgow, United Kingdom. Which of the following is Not included in the five nectar elements (Panchamrit) of India's climate action?
- A. Reach 500GW Non-fossil energy capacity by 2030.
  - B. 50 per cent of its energy requirements from renewable energy by 2030.
  - C. Reduction of total projected carbon emissions by ten billion tonnes from now to 2030.
  - D. Reduction of the carbon intensity of the economy by 45 per cent by 2030, over 2005 levels.
20. India's climate action strategy termed as Panchamrit, presented at COP26, reflects which of the following global principles under the UNFCCC?
- A. Precautionary Principle and Carbon Market Mechanism
  - B. CBDR-RC (Common But Differentiated Responsibilities and Respective Capabilities)
  - C. Polluter Pays Principle and Just Transition
  - D. Cap and Trade and Principle of Subsidiarity
21. Consider the following pairs:
- | Terms sometimes seen in the news  | : | Their origin       |
|-----------------------------------|---|--------------------|
| 1. Annex-I Countries              | : | Cartagena Protocol |
| 2. Certified Emissions Reductions | : | Nagoya Protocol    |
| 3. Clean Development Mechanism    | : | Kyoto Protocol     |
- Which of the pairs given above is / are correctly matched?
- A. 1 and 2 only
  - B. 2 and 3 only
  - C. 3 only
  - D. 1, 2 and 3

## 8. Ben Gurion Canal Project?

- The Ben Gurion Canal Project is a theoretical proposal to cut a canal through Israel's Negev Desert, creating an alternative route to the Suez Canal. Envisioned in the 1960s, it aimed to challenge Egypt's monopoly on the shortest trade route between Europe and Asia.
- However, the project faces immense challenges, including logistical complexities, high costs, a longer route, and security concerns in a region marked by ongoing military threats.

### What is the Suez Canal?

- It is an artificial sea-level waterway in Egypt (completed in 1869), connecting the Mediterranean Sea to the Red Sea through the Isthmus of Suez and dividing Africa and Asia. The 193 km long canal is a key trade route between Europe and Asia.

- The idea is to cut a canal through the Israeli-controlled Negev Desert from the tip of the Gulf of Aqaba — the eastern arm of the Red Sea that juts into Israel's southern tip and south-western Jordan — to the Eastern Mediterranean coast, thus creating an alternative to the Egyptian-controlled Suez Canal that starts from the western arm of the Red Sea and passes to the southeastern Mediterranean through the northern Sinai peninsula.

## Mediterranean Sea

- The Mediterranean Sea is a sea connected to the Atlantic Ocean, surrounded by the Mediterranean Basin and almost completely enclosed by land: on the north by Southern Europe and Anatolia, on the south by North Africa, and on the east by the Levant in West Asia.
- The Mediterranean has played a central role in the history of Western civilization. Geological evidence indicates that around 5.9 million years ago the Mediterranean was cut off from the Atlantic and was partly or completely desiccated over a period of some 600,000 years during the Messinian salinity crisis before being refilled by the Zanclean flood about 5.3 million years ago.
- The Mediterranean Sea covers an area of about 2,500,000 km<sup>2</sup> representing 0.7% of the global ocean surface, but its connection to the Atlantic via the Strait of Gibraltar—the narrow strait that connects the Atlantic Ocean to the Mediterranean Sea and separates the Iberian Peninsula in Europe from Morocco in Africa—is only 14 km (9 mi) wide.
- The Mediterranean Sea encompasses a vast number of islands, some of them of volcanic origin. The two largest islands, in both area and population, are Sicily and Sardinia.
- The Mediterranean Sea has an average depth of 1,500 m (4,900 ft) and the deepest recorded point is 5,109 m in the Calypso Deep in the Ionian Sea.
- It lies between latitudes 30° and 46° N and longitudes 6° W and 36° E. Its west–east length, from the Strait of Gibraltar to the Gulf of Alexandretta, on the southeastern coast of Turkey, is about 4,000 kilometres (2,500 mi). The north–south length varies greatly between different shorelines and whether only straight routes are considered.
- Also including longitudinal changes, the shortest shipping route between the multinational Gulf of Trieste and the Libyan coastline of the Gulf of Sidra is about 1,900 kilometres (1,200 mi).
- The water temperatures are mild in winter and warm in summer and give name to the Mediterranean climate type due to the majority of precipitation falling in the cooler months.
- Its southern and eastern coastlines are lined with hot deserts not far inland, but the immediate coastline on all sides of the Mediterranean tends to have strong maritime moderation.
- The sea was an important route for merchants and travellers of ancient times, facilitating trade and cultural exchange between the peoples of the region.
- The history of the Mediterranean region is crucial to understanding the origins and development of many modern societies.
- The Roman Empire maintained nautical hegemony over the sea for centuries and is the only state to have ever controlled all of its coast.
- The countries surrounding the Mediterranean and its marginal seas in clockwise order are Spain, France, Monaco, Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Syria, Lebanon, Israel, Palestine, Egypt, Libya, Tunisia, Algeria, and Morocco; Malta and Cyprus are island countries in the sea. In addition, Gibraltar, an overseas territory of the United Kingdom, is located on the coast of the Mediterranean.
- The drainage basin encompasses a large number of other countries, the Nile being the longest river ending in the Mediterranean Sea.

## Negev Desert

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- The Negev is a desert and semidesert region of southern Israel.
- The region's largest city and administrative capital is Beersheba (pop. 211,251), in the north.
- At its southern end is the Gulf of Aqaba and the resort city and port of Eilat.
- It contains several development towns, including Dimona, Arad, and Mitzpe Ramon, as well as a number of small Bedouin towns, including Rahat, Tel Sheva, and Lakiya.
- There are also several kibbutzim, including Revivim and Sde Boker; the latter became the home of Israel's first Prime Minister, David Ben-Gurion, after his retirement from politics.
- Although historically part of a separate region (known during the Roman period as Arabia Petraea), the Negev was added to the proposed area of Mandatory Palestine, of which large parts later became Israel, on 10 July 1922, having been conceded by British representative St John Philby "in Trans-Jordan's name".
- Despite this, the region remained exclusively Arab until 1946; in response to the British Morrison–Grady Plan which would have allotted the area to an Arab state, the Jewish Agency enacted the 11 points in the Negev plan to begin Jewish settlement in the area.
- A year later, the United Nations Partition Plan for Palestine allotted a larger part of the area to the Jewish State which became Israel.
- The desert is home to the Ben-Gurion University of the Negev, whose faculties include the Jacob Blaustein Institutes for Desert Research and the Albert Katz International School for Desert Studies, both located on the Midreshet Ben-Gurion campus adjacent to Sde Boker.
- In October 2012, global travel guide publisher Lonely Planet rated the Negev second on a list of the world's top ten regional travel destinations for 2013, noting its current transformation through development.

## David Ben Gurion

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- David Ben-Gurion was the primary national founder of the State of Israel as well as the state's first prime minister.
- Born in Płońsk, then part of Congress Poland, to Polish Jewish parents, he immigrated to the Palestine region of the Ottoman Empire in 1906.
- Adopting the name of Ben-Gurion in 1909, he rose to become the preeminent leader of the Jewish community in British-ruled Mandatory Palestine from 1935 until the establishment of the State of Israel in 1948, which he led until 1963 with a short break in 1954–55.
- Ben-Gurion's interest for Zionism developed early in his life, leading him to become a major Zionist leader and executive head of the World Zionist Organization in 1946.
- As head of the Jewish Agency from 1935, and later president of the Jewish Agency Executive, he was the de facto leader of the Jewish community in Palestine, and largely led the movement for an independent Jewish state in Mandatory Palestine.
- On 14 May 1948, he formally proclaimed the establishment of Israel, and was the first to sign the Israeli Declaration of Independence, which he had helped to write.
- Under Ben-Gurion's leadership, the 1948 Arab–Israeli War saw the uniting of the various Jewish militias into the Israel Defense Forces (IDF), and the expulsion and flight of a majority of the Palestinian Arab population. Subsequently, he became known as "Israel's founding father".

- Following the war, Ben-Gurion served as Israel's first prime minister and minister of defence.
- As prime minister, he helped build state institutions, presiding over national projects aimed at the development of the country.
- He also oversaw the absorption of Jewish immigrants.
- A major part of his foreign policy was improving relations with West Germany through a reparations agreement in compensation for Nazi confiscation of Jewish property during the Holocaust.
- In 1954, he resigned as prime minister and minister of defence but remained a member of the Knesset.
- He returned as minister of defence in 1955 after the Lavon Affair and the resignation of Pinhas Lavon.
- Later that year he became prime minister again, following the 1955 elections. He led Israel's reprisal operations to Arab guerrilla attacks, and its invasion of Egypt along with Britain and France during the Suez Crisis in 1956.
- He stepped down from office in 1963, and retired from political life in 1970.
- He then moved to his modest "hut" in Sde Boker, a kibbutz in the Negev desert, where he lived until his death.
- Posthumously, Ben-Gurion was named one of Time magazine's 100 Most Important People of the 20<sup>th</sup> century.

## QUESTIONS

**Solve the multiple choice questions:**

22. What is the most significant geostrategic implication of the proposed Ben Gurion Canal Project for global trade?
  - A. It would offer a shorter route between the Indian Ocean and the Mediterranean Sea than the Suez Canal.
  - B. It would provide a neutral maritime passage, reducing dependency on Egypt and the Suez Canal.
  - C. It would connect the Negev Desert to the Nile Basin, expanding agricultural productivity.
  - D. It would allow Russia direct access to the Mediterranean through Israeli waters.
23. Which of the following natural geographic factors poses the greatest logistical challenge to the construction of the Ben Gurion Canal?
  - A. High seismic activity in the Negev Desert
  - B. Elevation gradient between the Gulf of Aqaba and the Mediterranean Sea
  - C. Volcanic islands in the Mediterranean
  - D. Coral reefs in the Gulf of Aqaba
24. Mediterranean Sea is bordered by which of the following countries?
  1. Slovenia
  2. Croatia
  3. Bosnia and Herzegovina
  4. Montenegro
  5. Tunisia
  6. Nigeria

7. Greece

Select the correct answer using codes given below:

- A. 1, 2, 3, 4, 5 and 7 only
- B. 1, 2, 5 and 6 only
- C. 1, 2, 4, 5 and 6 only
- D. 1, 2, 3, 4, 5, 6 and 7

25. Which of the following Mediterranean territories is a British Overseas Territory that is NOT located on the Mediterranean coastline of Asia or Africa?
- A. Akrotiri
  - B. Dhekelia
  - C. Gibraltar
  - D. Cyprus

## 9. UK to co-host global conference with aim of resolving Sudan's civil war

- On April 15, 2025, the UK government is hosting a high-level ministerial conference at Lancaster House, London, aimed at uniting nearly 20 countries and organisations to push for peace in Sudan.
- The event marks the second anniversary of Sudan's devastating civil war, which has triggered the world's worst humanitarian crisis, with half the population facing severe food shortages and 11 million internally displaced.
- Despite the scale of the suffering, Sudan has remained low on the global diplomatic agenda.
- Co-hosted by Germany and France, the conference notably excludes Sudan's warring factions—the Sudanese Armed Forces and the paramilitary Rapid Support Forces (RSF)—to instead focus diplomatic pressure on external backers, urging them to stop arming the combatants and support a ceasefire. Sudan's foreign minister, Ali Youssef, protested the exclusion and criticised the inclusion of countries like the UAE, Chad, and Kenya, which he labeled as "stakeholders in the war."
- The Sudanese government accuses the UAE of arming the RSF and aiding in genocide against the Masalit tribe, claims the UAE dismisses as political theatrics.
- The UK's initiative is risky for Foreign Secretary David Lammy, especially as it may require pressing allies like the UAE and Saudi Arabia.
- Both the Sudanese Armed Forces and RSF are accused by the UN of using starvation as a weapon of war.
- Additionally, scrutiny is expected over U.S. aid cuts, which have impacted humanitarian efforts and war crimes monitoring in Sudan.
- NGOs like Human Rights Watch stress that civilian protection must be prioritized, even without a ceasefire.

- Kate Ferguson of Protection Approaches called for the creation of a “coalition of conscience,” while Avaaz’s Shayna Lewis emphasized the urgent need to restore telecommunications, as over 25 million Sudanese remain cut off from communication, complicating media coverage and aid efforts.

## Sudan’s civil war

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- Sudan’s civil war is an ongoing and deeply complex conflict that erupted on April 15, 2023, between the Sudanese Armed Forces (SAF) and the Rapid Support Forces (RSF)—two rival military factions that were once allies. The war has its roots in a long history of political instability, military coups, and the struggle for control over Sudan’s future following the ousting of long-time dictator Omar al-Bashir in 2019.

## Sudanese Armed Forces (SAF)

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- Led by General Abdel Fattah al-Burhan, de facto head of state.
- The official national army of Sudan.

## Rapid Support Forces (RSF)

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- Paramilitary group led by Mohamed Hamdan Dagalo, known as Hemedti.
- Evolved from the notorious Janjaweed militias responsible for atrocities in Darfur.
- After Bashir’s fall, a power-sharing arrangement was set up between civilians and the military. However, tensions grew, especially as pressure increased to integrate the RSF into the national army—a move that Hemedti resisted. These tensions ultimately led to full-blown war in April 2023.

## Current Situation:

- Khartoum, the capital, and Darfur have seen intense fighting.
- Thousands of civilians have been killed, and millions displaced internally and across borders.
- Widespread ethnic violence, particularly in West Darfur, has drawn warnings of potential genocide.
- The humanitarian crisis is massive: limited access to food, water, healthcare, and shelter.
- Peace efforts by regional and international bodies (e.g., AU, UN, Saudi-US-led talks) have largely failed to produce a lasting ceasefire.

## Humanitarian Impact:

- Over 8 million people displaced (as of early 2025).
- Catastrophic damage to infrastructure and the economy.
- Widespread reports of war crimes and sexual violence.

## Sudan and It’s Geographical Importance

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### Geographic Location:

- **Borders:** Sudan shares borders with seven countries — Egypt (north), Libya (northwest), Chad (west), the Central African Republic (southwest), South Sudan (south), Ethiopia (southeast), and Eritrea (east).
- **Coastline:** It has a stretch along the Red Sea (about 853 km), providing access to one of the most important maritime trade routes in the world.
- **Nile River:** Both the Blue Nile and White Nile meet in Sudan’s capital, Khartoum, making the country central to Nile basin dynamics.

### Importance in the World:

#### 1. Strategic Location

- Located near the Suez Canal and the Bab el-Mandeb Strait, Sudan is close to key global shipping lanes that connect Europe, Asia, and Africa.

- Its Red Sea ports, such as Port Sudan, are vital for trade and access to the Middle East and North Africa (MENA) region.

## 2. Nile Waters Politics

- As a Nile Basin country, Sudan plays a key role in the geopolitics of Nile water sharing, especially between Egypt and Ethiopia (regarding the Grand Ethiopian Renaissance Dam - GERD).

## 3. Natural Resources

- Rich in minerals (especially gold), oil, and agricultural land, Sudan is resource-abundant.
- Its agricultural potential, particularly in the Nile Valley and Gezira region, makes it important for regional food security.

## 4. Gateway Between Arab and African Worlds

- Culturally and geographically, Sudan is a bridge between Arab North Africa and Sub-Saharan Africa, influencing both regions.
- It is a member of both the Arab League and the African Union.

## QUESTIONS

**Solve the multiple choice questions:**

26. What specific geopolitical advantage makes Sudan strategically significant in global diplomacy and trade?
- Its vast oil reserves in the Sahel region
  - Control over the Strait of Hormuz
  - Its Red Sea coastline and the Nile River confluence
  - Its high-altitude military bases ideal for surveillance
27. Sudan is bordered by which of the following countries?
- Central African Republic
  - Chad
  - Libya
  - Egypt
  - Eritrea
  - Ethiopia
- Select the correct answer using codes given below:
- 4, 5 and 6 only
  - 1, 4, 5 and 6 only
  - 1, 2, 4 and 6 only
  - 1, 2, 3, 4, 5 and 6
28. What was a historic legal outcome of the War in Darfur for Sudan's then-president Omar al-Bashir?
- He was convicted by the African Court on Human and Peoples' Rights
  - He was nominated for a UN peace prize
  - He was indicted by the International Criminal Court for genocide
  - He resigned and went into voluntary exile in Egypt

# 10. Breakthrough Prize 2025

- The 2025 Breakthrough Prize in Fundamental Physics was awarded to 13,508 physicists across four collaborative projects at CERN, the European particle physics laboratory near Geneva, Switzerland.
- Dubbed the “Oscars of Science”, the award was announced as part of the 11<sup>th</sup> annual Breakthrough Prizes.
- Six prizes worth \$3 million each were announced in Life Sciences, Mathematics and Fundamental Physics.
- The ceremony held in Santa Monica, California, featured Hollywood celebrities such as Leonardo DiCaprio, Jodie Foster and Zoe Saldana, and tech royalty like Facebook co-founder Mark Zuckerberg, Amazon founder Jeff Bezos and OpenAI CEO Sam Altman.

## What are the Breakthrough Prizes?

- The awards were established in 2013 by Mark Zuckerberg and his wife Priscilla Chan, former Google chief Sergey Brin, genomics company 23&Me founder Anne Wojcicki, and tech investor couple Yuri and Julia Milner.
- As part of its mission, the prize celebrates individual achievements and honours scientists as the heroes of society, aims to inspire the next generation of scientists, and pursues “science for the benefit of all as a global, apolitical organization.”

## Breakthrough Prize in Life Sciences

- The award in this category was given to three groups of scientists:

### 01 Weight-loss drugs

- Five scientists who contributed to the development of the weight loss drugs, Ozempic and Wegovy, were awarded the Breakthrough Prize in Life Sciences. Daniel J. Drucker, Joel Habener, Jens Juul Holst, Lotte Bjerre Knudsen and Svetlana Mojsov were awarded the Prize for discovering and characterising the GLP-1 hormone, which aided the creation of drugs treating diabetes and obesity.

### 02 Multiple Sclerosis treatment

- Multiple Sclerosis is an unpredictable chronic disease caused by the immune system attacking the protective sheath that covers nerve fibres of the central nervous system.
- Alberto Ascherio and Stephen L. Hauser were awarded the Prize for identifying the role of the B-cells of the immune system in Multiple Sclerosis (MS) and devising treatments targeted at the same.
- The duo also established the Epstein-Barr virus infection as the leading cause of MS.

### 03 Gene-editing technologies

- David R Liu was awarded the Prize for developing the base editing and prime editing technologies widely used to edit the DNA of living organisms.
- These are significant as they can edit the DNA without cutting its double helix, and rewrite entire stretches of defective DNA with a corrected version.

## Breakthrough Prize in Fundamental Physics

- The Breakthrough Prize in Fundamental Physics was awarded to four collaborations at the Large Hadron Collider (LHC) in CERN – ALICE, ATLAS, CMS and LHCb.

- The LHC is the world's largest and most powerful particle accelerator, causing protons to accelerate and collide, thus helping scientists study the properties of matter.
- The four collaborations studied the Higgs boson, considered as elementary as electrons, photons or neutrinos.
- The Higgs boson, also known as the 'God Particle', is known to impart mass to every other particle, and is believed to help explain how the Big Bang happened 13.7 million years ago.
- Thus, the collaborations studied the Higgs boson to understand how they impart mass to fundamental particles.
- They also discovered new types of particles to understand the strong nuclear force, and tested fundamental theories by discovering new processes to understand why matter exists in the universe.
- According to the award citation, the \$3 million prize was awarded for their "detailed measurements of Higgs boson properties confirming the symmetry-breaking mechanism of mass generation, the discovery of new strongly interacting particles... and the exploration of nature at the shortest distances and most extreme conditions at CERN's Large Hadron Collider".
- The ATLAS and CMS collaborations will receive \$1 million each, while ALICE and LHCb will receive \$500,000 each. The award recognises the 13,508 co-authors of publications based on LHC Run-2 data released between 2015 and July 15, 2024.
- The prize funds will be awarded in their entirety to the CERN & Society Foundation for the collaborations, to award grants to doctoral students from member institutes researching at CERN.

### Breakthrough Prize in Mathematics

- The Mathematics Breakthrough Prize was awarded to Dennis Gaitsgory for "his central role in the proof of the geometric Langlands conjecture."
- The Langlands program is described as a broad research program spanning several fields of mathematics, which grew out of a series of conjectures proposing precise connections between seemingly disparate mathematical concepts.
- The award recognises Gaitsgory's dedication of over three decades to this research, having developed new mathematical tools in derived algebraic geometry to prove a major foundational conjecture within that field.

### Other Awards

- The Breakthrough Prize Foundation also announced six New Horizons Prizes, each worth \$100,000, to honour eight early-career physicists and mathematicians.
- Additionally, the foundation awarded the Maryam Mirzakhani New Frontiers Prize to three women mathematicians pursuing their PhD, each with a \$50,000 cash award.

## QUESTIONS

**Solve the multiple choice questions:**

- 29.** Why were the four LHC collaborations awarded the 2025 Breakthrough Prize in Fundamental Physics?
- A. For constructing the Large Hadron Collider and increasing its energy capacity
  - B. For the theoretical formulation of the Higgs boson prior to its discovery
  - C. For precise studies confirming mass generation through symmetry-breaking, discovering new strongly interacting particles, and exploring nature at the shortest distances
  - D. For identifying gravitational waves using high-energy collisions at CERN

**30.** Which of the following statements is/are True regarding the Large Hadron Collider (LHC)?

1. It is the world's largest and most powerful particle accelerator.
2. It first started up on 10 September 2008, and remains the latest addition to CERN's accelerator complex.
3. The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way.

Select the correct answer using the codes given below:

- A. 1 only
- B. 1 and 2 only
- C. 1 and 3 only
- D. 1, 2 and 3



Career  
Launcher

1. **A** 'Bharat Ratna', the highest civilian Award of the country, was instituted in the year 1954. Any person without distinction of race, occupation, position or sex is eligible for these awards. It is awarded in recognition of exceptional service/performance of the highest order in any field of human endeavour. The recommendations for Bharat Ratna are made by the Prime Minister himself to the President. No formal recommendations for this are necessary. The number of annual awards is restricted to a maximum of three in a particular year. While the maximum of three awards per year is a standard guideline, 2024 saw five recipients — breaking the numerical tradition though constitutionally permissible. On conferment of the award, the recipient receives a Sanad (certificate) signed by the President and a medallion. The Award does not carry any monetary grant. In terms of Article 18 (1) of the Constitution, the award cannot be used as a prefix or suffix to the recipient's name. However, should an award winner consider it necessary, he/she may use the following expression in their biodata/letterhead/visiting card etc. to indicate that he/she is a recipient of the award: 'Awarded Bharat Ratna by the President' or 'Recipient of Bharat Ratna Award'.
2. **B** 'Bharat Ratna', the highest civilian Award of the country, was instituted in the year 1954. The award was originally limited to achievements in the arts, literature, science, and public services, but the Government of India expanded the criteria to include "any field of human endeavor" in December 2011. The first recipients of the Bharat Ratna were: the former Governor-General of the Union of India C. Rajagopalachari, the former President of the Republic of India Sarvepalli Radhakrishnan; and the Indian physicist C. V. Raman, who were honoured in 1954. The original statutes did not provide for posthumous awards but were amended in January 1966 to permit them to honor former Prime Minister Lal Bahadur Shastri, the first individual to be honored posthumously. Though usually conferred on India-born citizens, the award has been conferred on one naturalized citizen, Mother Teresa, and on two non-Indians: Abdul Ghaffar Khan (born in British India and later a citizen of Pakistan) and Nelson Mandela, a citizen of South Africa. The Bharat Ratna, along with other personal civil honours, was briefly suspended from July 1977 to January 1980, during the change in the national government; and for a second time from August 1992 to December 1995, when several public-interest litigations challenged the constitutional validity of the awards.
3. **D** Sri Lanka is separated from India by a narrow channel of sea formed by the Palk Strait and the Gulf of Mannar, while Maldives Islands are situated to the south of the Lakshadweep Islands. India shares its land boundaries with Pakistan and Afghanistan in the northwest, China (Tibet), Nepal and Bhutan in the north and Myanmar and Bangladesh in the east. Our southern neighbours across the sea consist of the two island countries, namely Sri Lanka and Maldives.
4. **C** The 13th Amendment, passed in 1987 after the Indo-Sri Lanka Accord, was aimed at devolving certain administrative powers like agriculture, health, housing, and education to provincial councils. It was intended as a constitutional solution to the ethnic conflict and civil war, especially in the Tamil-dominated Northern and Eastern Provinces. On 29 July 1987, Indo-Sri Lanka Accord was signed between Indian Prime Minister Rajiv Gandhi and Sri Lankan President J.R. Jayewardene which stated the devolution of powers to the provinces.
5. **B** The Supreme Court ruled that if a Bill is presented for reconsideration (after being returned by the Governor), the Governor must grant assent within a maximum of one month. This decision reinforces accountability and discourages "pocket veto" practices.

6. **A** The Supreme Court held that once a Bill is repassed by the State Legislature without amendments, the Governor must grant assent and cannot reserve it for the President, unless the repassed Bill is different from the original. Doing so would be arbitrary and unconstitutional under Article 200.
7. **C** The court emphasized that Governors must be held to judicially determinable standards due to the constitutional significance of Article 200 and India's federal structure. The phrase "as soon as possible" was interpreted to require time-bound actions.
8. **C** A key point of the 2025 ruling is that the Supreme Court has now judicially imposed time limits on Governors' actions under Article 200, whereas the President under Article 111 has no constitutional time limit, enabling the pocket veto. This was a major constitutional differentiation emphasized in the judgment.
9. **C** The Samudrayaan Mission is India's first manned ocean mission, and its submersible, MATSYA 6000, is designed to carry three personnel up to 6000 metres deep in the ocean. The goal is scientific exploration and resource mapping, not satellite deployment or oil drilling.
10. **C** The MATSYA 6000 is being developed by the National Institute of Ocean Technology (NIOT), Chennai, under the Ministry of Earth Sciences, not the Indian Navy or Ministry of Defence. All other statements are correct regarding its features and purpose.
11. **C** The Spratly Islands are widely dispersed over a large area of the South China Sea and are claimed in full or in part by China, Vietnam, the Philippines, Malaysia, Brunei, and Taiwan, making them the most geopolitically contested.
12. **D** The United Nations Convention on the Law of the Sea (UNCLOS), 1982 is an international agreement that establishes the legal framework for marine and maritime activities. It is also known as Law of the Sea. It divides marine areas into five main zones namely- Internal Waters, Territorial Sea, Contiguous Zone, Exclusive Economic Zone (EEZ) and the High Seas. It is the only international convention which stipulates a framework for state jurisdiction in maritime spaces. It provides a different legal status to different maritime zones. It provides the backbone for offshore governance by coastal states and those navigating the oceans. It not only zones coastal states' offshore areas but also provides specific guidance for states' rights and responsibilities in the five concentric zones. While UNCLOS has been signed and ratified by nearly all the coastal countries in the South China Sea, its interpretation is still hotly disputed.
13. **D** Union Cabinet has approved India to sign the Biodiversity Beyond National Jurisdiction (BBNJ) Agreement, also known as the High Seas Treaty. The Ministry of Earth Sciences will spearhead its implementation. High seas are areas outside the national jurisdiction of any country. Typically, national jurisdictions extend up to 200 nautical miles (370 km) from the coastline, an area called Exclusive Economic Zone (EEZ). High Seas constitute about 64%, roughly two-thirds, of the total ocean area and are considered global commons. They belong to no one, and everyone enjoys equal rights for navigation, overflight, economic activities, scientific research, or laying of infrastructure like undersea cables. It is formally called the Agreement on Conservation and Sustainable Use of Marine Biological Diversity of Areas Beyond National Jurisdiction. It is an international treaty under the United Nations Convention on the Law of the Sea (UNCLOS). BBNJ Agreement will be the third implementation agreement under UNCLOS if and when it enters into force, alongside its sister implementation agreements. Agreement was adopted in 2023 and is open for signature for two years. It will be an international legally binding treaty after it enters force 120 days after 60 countries ratify it.

- 14. C** The Inter-Dominion Accord of 1948 served as a temporary water-sharing arrangement, under which India agreed to release water to Pakistan through existing canals in exchange for annual payments, until a more permanent treaty could be negotiated.
- 15. B** The Indus Water Treaty (IWT) is a water-distribution treaty between India and Pakistan, arranged and negotiated by the World Bank, to use the water available in the Indus River and its tributaries. It was signed in Karachi on 19 September 1960 by then Indian Prime Minister Jawaharlal Nehru and then Pakistani president Ayub Khan. The Treaty gives control over the waters of the three "eastern rivers" — the Beas, Ravi and Sutlej with a mean annual flow of 41 billion m<sup>3</sup> (33 million acre-ft) — to India, while control over the waters of the three "western rivers" — the Indus, Chenab and Jhelum with a mean annual flow of 99 billion m<sup>3</sup> — to Pakistan. India has about 20% of the total water carried by the Indus system while Pakistan has 80%.
- 16. B** The Air Quality Index (AQI) in India is calculated by the Central Pollution Control Board (CPCB) and includes eight major pollutants, but not all gases are considered. The pollutants normally considered in AQI are: 1. PM<sub>10</sub> (Particulate Matter  $\leq 10$  microns), 2. PM<sub>2.5</sub> (Particulate Matter  $\leq 2.5$  microns), 3. Nitrogen Dioxide (NO<sub>2</sub>), 4. Sulfur Dioxide (SO<sub>2</sub>), 5. Carbon Monoxide (CO), 6. Ozone (O<sub>3</sub>), 7. Ammonia (NH<sub>3</sub>) and 8. Lead (Pb).
- 17. B** The Commission for Air Quality Management (CAQM) is not merely an advisory body. It is a statutory body with binding powers established under a dedicated Act in 2021. It has authority to issue orders and directions enforceable by law. While it may coordinate with the Environment Ministry, it is not under it in the traditional advisory sense. Commission for Air Quality Management (CAQM) is a statutory body established under the Commission for Air Quality Management in National Capital Region (NCR) and Adjoining Areas, Act 2021. Its mandate is to better coordination, research, identification, and resolution of problems surrounding the air quality index and for matters connected therewith or incidental thereto. It undertakes action for the prevention and control of Air pollution in Delhi-NCR & Adjoining Areas which impacts the air quality of the National Capital Territory (NCT) of Delhi. The Commission is required to coordinate its actions on monitoring of air quality with the government of Delhi and the adjoining states, which includes Punjab, Haryana, Rajasthan, and Uttar Pradesh.
- 18. A** The Commission for Air Quality Management (CAQM) is not merely an advisory body. It is a statutory body with binding powers established under a dedicated Act in 2021. It has authority to issue orders and directions enforceable by law. While CAQM has binding powers to issue directions, it does not independently impose criminal penalties or fines without due legal process or court mechanisms. Other powers, like coordination, research, and preparing environmental codes, are well within its mandate.
- 19. C** The Government of India has articulated and put across the concerns of developing countries at the 26<sup>th</sup> session of the Conference of the Parties (COP26) to the United Nations Framework Convention on Climate Change (UNFCCC) held in Glasgow, United Kingdom. Further, India presented the following five nectar elements (*Panchamrit*) of India's climate action: 1. Reach 500GW Non-fossil energy capacity by 2030. 2. 50 per cent of its energy requirements from renewable energy by 2030. 3. Reduction of total projected carbon emissions by one billion tonnes from now to 2030. 4. Reduction of the carbon intensity of the economy by 45 per cent by 2030, over 2005 levels. 5. Achieving the target of net zero emissions by 2070.

- 20. B** India's Panchamrit strategy embodies CBDR-RC, a foundational UNFCCC principle which states that all countries are responsible for addressing global environmental destruction yet not equally responsible — developed nations have contributed more historically, while developing countries like India require space to grow sustainably.
- 21. C** Annex-I countries are a classification under the Kyoto Protocol, not the Cartagena Protocol. These are primarily developed countries and economies in transition, which have binding emission reduction targets. The Cartagena Protocol relates to biosafety, particularly in handling genetically modified organisms (GMOs), under the Convention on Biological Diversity (CBD). Certified Emission Reductions (CERs) are units issued under the Clean Development Mechanism (CDM) of the Kyoto Protocol. They are used in carbon trading markets and help countries meet emission reduction targets. The Nagoya Protocol, like Cartagena, is also under the CBD, and deals with access to genetic resources and benefit-sharing, not emissions. The Clean Development Mechanism (CDM) is one of the flexible mechanisms under the Kyoto Protocol. It allows developed countries (Annex-I) to invest in emission-reduction projects in developing countries, earning CERs.
- 22. B** The Ben Gurion Canal, if built, would reduce Egypt's monopoly over the Suez Canal and offer an alternative maritime route through Israeli territory. Although it would be longer and costlier, it has strategic potential during geopolitical conflicts, particularly if the Suez Canal is blocked.
- 23. B** The Negev Desert lies between two different sea levels—the Gulf of Aqaba (Red Sea) and the Mediterranean Sea, requiring extensive excavation, locks, and water transfer systems due to the terrain elevation differences, making the project technically and economically challenging. The Strait of Gibraltar, just 14 km wide, is the sole maritime gateway between the Mediterranean and Atlantic, making it a key chokepoint for trade and naval movement. Any canal project like Ben Gurion would still ultimately rely on access through this narrow strait for intercontinental shipping.
- 24. A** Mediterranean Sea is a sea connected to the Atlantic Ocean, surrounded by the Mediterranean basin and almost completely enclosed by land: on the east by the Levant in West Asia, on the north by Anatolia in West Asia and Southern Europe, on the south by North Africa, and on the west almost by the Morocco–Spain border. The countries surrounding the Mediterranean and its marginal seas in clockwise order are Spain, France, Monaco, Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Syria, Lebanon, Israel, Palestine (Gaza Strip), Egypt, Libya, Tunisia, Algeria, and Morocco; Cyprus and Malta are island countries in the sea. In addition, Northern Cyprus (de facto state) and two overseas territories of the United Kingdom (Akrotiri and Dhekelia, and Gibraltar) also have coastlines along the Mediterranean Sea.
- 25. C** Gibraltar is a British Overseas Territory located on the southern tip of the Iberian Peninsula in Europe, guarding the entrance to the Mediterranean Sea from the Atlantic. Akrotiri and Dhekelia are also British territories, but they lie on Cyprus, closer to the Middle East (Asia). The Mediterranean Sea is a sea connected to the Atlantic Ocean, surrounded by the Mediterranean basin and almost completely enclosed by land: on the east by the Levant in West Asia, on the north by Anatolia in West Asia and Southern Europe, on the south by North Africa, and on the west almost by the Morocco–Spain border. The countries surrounding the Mediterranean and its marginal seas in clockwise order are Spain, France, Monaco, Italy, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Albania, Greece, Turkey, Syria, Lebanon, Israel, Palestine (Gaza Strip), Egypt, Libya, Tunisia, Algeria, and Morocco; Cyprus and Malta are island countries in the sea. In addition, Northern Cyprus (de facto state) and two overseas territories of the United Kingdom (Akrotiri and Dhekelia, and Gibraltar) also have coastlines along the Mediterranean Sea.

26. **C** Sudan is geopolitically critical due to its 853 km Red Sea coastline, linking to vital global trade routes, and the confluence of the Blue and White Nile in Khartoum, giving it influence over Nile basin geopolitics involving Egypt, Ethiopia, and other riparian states. Resistance by the RSF to integrate into the national army amid rising civilian pressure post-2019. The conflict erupted when the RSF, led by Hemedti, resisted integration into the national army (SAF). This resistance intensified after the fall of dictator Omar al-Bashir in 2019, during a fragile power-sharing agreement between the military and civilians.
27. **D** Sudan is a country in Northeast Africa. It borders the Central African Republic to the southwest, Chad to the west, Libya to the northwest, Egypt to the north, the Red Sea to the east, Eritrea and Ethiopia to the southeast, and South Sudan to the south.
28. **C** Omar al-Bashir became the first sitting head of state to be indicted by the International Criminal Court (ICC) for genocide, crimes against humanity, and war crimes related to the Darfur conflict. The ICC issued arrest warrants in 2009 and 2010.
29. **C** For precise studies confirming mass generation through symmetry-breaking, discovering new strongly interacting particles, and exploring nature at the shortest distances. The prize specifically recognized their detailed measurements of the Higgs boson, confirmation of the symmetry-breaking mechanism of mass generation, discovery of new particles, and investigations into the fundamental nature of matter during LHC Run-2. The Breakthrough Prize Foundation also announced six New Horizons Prizes, each worth \$100,000, to honour eight early-career physicists and mathematicians.
30. **D** The Large Hadron Collider (LHC) is the world's largest and most powerful particle accelerator. It first started up on 10 September 2008, and remains the latest addition to CERN's accelerator complex. The LHC consists of a 27-kilometre ring of superconducting magnets with a number of accelerating structures to boost the energy of the particles along the way. All the controls for the accelerator, its services and technical infrastructure are housed under one roof at the CERN Control Centre. From here, the beams inside the LHC are made to collide at four locations around the accelerator ring, corresponding to the positions of four particle detectors – ATLAS, CMS, ALICE and LHCb.