GEOGRAPHY

Anthropocene as Earth's new epoch

Rising global temperatures, sea levels, depleting ozone layer and acidifying oceans are the result of human activity that has "distinctively" altered our planet. Now, a team of scientists have voted to declare "Anthropocene" as a new chapter in the Earth's geological history.

Anthropocene Epoch

- Coined by Paul Crutzen and Eugene Stoermer in 2000 to denote the present geological time interval, Anthropocene has been used to describe humanity's large impact on the environment.
- The scientific community have intensely debated in the past the idea to formally define it as a geological unit within the Geological Time Scale.
- Recently the 34-member Anthropocene Working Group (AWG), voted in favour of starting the new epoch.
- The result builds on an informal vote taken at the 2016 International Geological Congress in Cape Town, and lays the groundwork for a formal proposal by 2021 to the International Commission on Stratigraphy.
- The move signals the end of the Holocene epoch, which began 12,000 to 11,600 years ago.
- The International Union of Geological Sciences needs to ratify the AWG formal proposal, before the new epoch can formally be recognised.

Global boundary Stratotype Section and Point

- To show a clear transition from the Holocene, the scientists plan to identify a definitive geologic marker or 'golden spike'.
- It would be technically called a Global boundary Stratotype Section and Point (GSSP).
- For this, the group will search for the marker from around the globe, including a cave in northern Italy, corals in the Great Barrier Reef and a lake in China.

Demarcation of an epoch is not so easy

- To demonstrate a sedimentary record representing the start of the epoch, the researchers are likely to choose the radionuclides that came from atomic-bomb detonations from 1945 until the Limited Nuclear Test Ban Treaty of 1963.
- The stratigraphic evidence indicates a time-transgressive Anthropocene with multiple beginnings rather than a single moment of origin.
- Declaring a new epoch on the basis of the radionuclide signal alone impedes rather than facilitates scientific understanding of human involvement in Earth system change.

INTERNATIONAL AFFAIRS- BILATERAL, GROUPINGS, ORGANISATIONS

UNGA resolution demanding UK withdraw from Chagos Archipelago

India was among 116 nations to vote in favour of a UN General Assembly resolution demanding the UK to withdraw its "colonial administration" from the Chagos Archipelago unconditionally within six months. This aimed at supporting Mauritius in its quest for the restoration of sovereignty over the island chain in the Indian Ocean.

Colonization of Chagos

- The UK retained sovereignty over the islands after Mauritius gained its independence from Britain in 1968.
- It has been under continuous British sovereignty since 1814.
- The islands have since been used for defence purposes by the UK and the US, which established a military base on the island of Diego Garcia.
- The entire Chagossian population was forcibly removed from the territory between 1967 and 1973, and prevented from returning.

An ICJ obligation for UK

- The ICJ had said in its opinion that the UK Government is "under an obligation" to end its administration of the Chagos Archipelago as rapidly as possible.

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- It demanded that the UK withdraw its colonial administration from the Chagos Archipelago unconditionally within six months, enabling Mauritius to complete the decolonization of its territory as rapidly as possible.

Why India voted in favor of Mauritius?

- As a part of India's longstanding support to all peoples striving for decolonization, India has consistently supported Mauritius in its quest for the restoration of sovereignty.
- India has age-old people-to-people bonds with Mauritius.

UAE launches 'Golden Card' scheme

The United Arab Emirates has launched a permanent residency scheme to woo wealthy individuals and exceptional talents, a move that could attract more Indian professionals and businessmen to the Gulf nation.

Golden Card Programme

The "Golden Card" programme is open to investors and "exceptional talents" such as doctors, engineers, scientists, students and artists. The visa categories include:

- General investors who will be granted a 10 years visa
- Real estate investors, who can get a visa for 5 years Visa
- Entrepreneurs and talented professionals such as doctors, researchers and innovators: 10 years Visa
- Outstanding students — will also be permitted residency visas for 5 years
- All categories of visas can be renewed upon expiry.

Benefits of the move

- The new initiative will attract greater foreign investment and stimulate the local economy, making it more efficient and attractive for investors.
- It will also increase the UAE's competitiveness and reaffirms the country's position as a global incubator.
- The benefits of the permanent residency also include the spouse and children of the cardholder to ensure cohesive social ties.

Benefits for India

- The Indian expatriate community is reportedly the largest ethnic community in the UAE, constituting roughly about 30 per cent of the country's population of around nine million.
- Though most of the Indians living in the UAE are employed, about 10 per cent of the Indian population constitutes dependent family members, according to the Indian Embassy.

INDIAN ECONOMY

Currency chest

The Reserve Bank of India is planning to allow large modern currency chests to increase the service charges on cash deposited by non-chest bank branches from the existing rate of Rs. 5 per packet of 100 pieces to a higher rate subject to a maximum of Rs. 8 per packet. For this, only a currency chest (CC) that fulfils the minimum standards will be eligible to be classified as a large modern CC.

Currency chests:

- Currency chests are branches of selected banks authorised by the RBI to stock rupee notes and coins.
- The responsibility for managing the currency in circulation is vested in the RBI.
- The central bank advises the Centre on the number of notes to be printed, the currency denominations, security features and so on. The number of notes that need to be printed is determined using a statistical model that takes the pace of economic growth, rate of inflation and the replacement rate of soiled notes.
- The Government has, however, reserved the right to determine the amount of coins that have to be minted.

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Role of currency chests:

- The RBI offices in various cities receive the notes from note presses and coins from the mints. These are sent to the currency chests and small coin depots from where they are distributed to bank branches.
- The RBI has set up over 4,075 currency chests all over the country. Besides these, there are around 3,746 bank branches that act as small coin depots to stock small coins.
- Reserve Bank of India (RBI) recently issued new guidelines for banks to set up new currency chests. They include:
    - Area of the strong room/ vault of at least 1,500 sq ft. For those situated in hilly/ inaccessible places, the strong room/ vault area of at least 600 sq ft.
    - The new chests should have a processing capacity of 6.6 lakh pieces of banknotes per day. Those situated in the hilly/ inaccessible places, a capacity of 2.1 lakh pieces of banknotes per day.
    - The currency chests should have Chest Balance Limit (CBL) of Rs 1,000 crore, subject to ground realities and reasonable restrictions, at the discretion of the Reserve Bank.

ENVIRONMENT- CONSERVATION, BIO-DIVERSITY AND ISSUES

Coral bleaching

Researchers have found an alarming pattern of bleaching in the reefs in Mandapam, Keezhakkarai and Palk Bay in Gulf of Mannar regions.

Key findings:

- Sea surface temperature ranged from 28.7°C to 31°C in the August 2018-February 2019 period and there was no bleaching seen then.
- However, when the temperatures rose to between 32°C and 36°C between March 2019 and May 2019, researchers observed a pattern of bleaching in corals, which was different at different layers within the sea.

Coral reefs: Coral reefs are important hotspots of biodiversity in the ocean. Corals are animals in the same class (Cnidaria) as jellyfish and anemones. They consist of individual polyps that get together and build reefs.

Significance:

- Coral reefs support a wide range of species and maintain the quality of the coastal biosphere.
- Corals control the level of carbon dioxide in the water by converting it into a limestone shell. If this process does not take place, the amount of carbon dioxide in the ocean water would increase significantly and affect ecological niches.

Threats:

- Coral reefs are threatened by climate change.
- When the sea surface temperature increases beyond a tolerable limit, they undergo a process of bleaching.

What is bleaching?

- Basically bleaching is when the corals expel a certain algae known as zooxanthellae, which lives in the tissues of the coral in a symbiotic relationship. About 90% of the energy of the coral is provided by the zooxanthellae which are endowed with chlorophyll and other pigments. They are responsible for the yellow or reddish brown colours of the host coral. In addition the zooxanthellae can live as endosymbionts with jellyfish also.
- When a coral bleaches, it does not die but comes pretty close to it. Some of the corals may survive the experience and recover once the sea surface temperature returns to normal levels.

SCIENCE AND TECHNOLOGY- EVERYDAY SCIENCE, SPACE, NUCLEAR, DEFENCE ETC

Artemis Mission

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NASA has unveiled the calendar for the "Artemis" program that will return astronauts to the Moon for the first time in half a century, including eight scheduled launches and a mini-station in lunar orbit by 2024.

Key facts:

- Artemis 1 will be an uncrewed mission around the Moon planned for 2020.
- Next will come Artemis 2, which will orbit Earth's satellite with a crew around 2022; followed finally by Artemis 3 that will put astronauts on lunar soil in 2024, including the first woman.
- The three will be launched into space by the biggest rocket of all time, the Boeing-led Space Launch System (SLS), which is currently under development but has seen numerous delays and has been criticized in some quarters as a bloated jobs program.

About Artemis:

- NASA's next mission to the Moon will be called Artemis. ARTEMIS stands for Acceleration, Reconnection, Turbulence and Electrodynamics of Moon's Interaction with the Sun.
- The mission was named Artemis after the Greek mythological goddess of the Moon and twin sister to Apollo, namesake of the program that sent 12 American astronauts to the Moon between 1969 and 1972.
- Objective: It consists of spacecraft to measure what happens when the Sun's radiation hits our rocky moon, where there is no magnetic field to protect it.

Background: The ARTEMIS mission uses two of the five in-orbit spacecraft from another NASA Heliophysics constellation of satellites (THEMIS) that were launched in 2007 and successfully completed their mission earlier in 2010. The ARTEMIS mission allowed NASA to repurpose two in-orbit spacecraft to extend their useful science mission, saving tens of millions of taxpayer dollars instead of building and launching new spacecraft.

QUOTE OF THE DAY

You're allowed to scream, also allowed to cry, but not at all allowed to give up.

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DAILY ANSWER WRITING PRACTICE

Qns: What is Coral Bleaching ? What are the causes and consequences ?

Coral colonies are made up of hundreds or even thousands of genetically identical individuals called polyps. These polyps have microscopic algae called zooxanthellae living within their tissues. The coral provides the zooxanthellae with the compounds necessary for photosynthesis, which are metabolic waste products of the coral. In return, the zooxanthellae produce oxygen and help the coral to remove wastes. Most importantly, they supply the coral with organic products of photosynthesis which are predominantly carbohydrates. These compounds are utilized by the coral as building blocks in the manufacture of fats, as well as the synthesis of their calcium carbonate skeletons. Each coral polyp builds a skeleton of calcium carbonate. These corals together form a coral reef.

A byproduct of the symbiotic relationship with zooxanthellae is color. Several million zooxanthellae live and produce pigments in just one square inch of coral. These pigments are visible through the clear body of the polyp and are what gives many reef-building coral their beautiful color. When the symbiotic relation between zooxanthellae and coral breaks, it turns white. This is coral bleaching.

Coral Bleaching : When corals face stress by changes in conditions such as temperature, light, or nutrients, they expel the symbiotic algae zooxanthellae living in their tissues, causing them to turn completely white. This phenonmen is called coral bleaching. The pale white colour is of the translucent tissues of calcium carbonate which are visible due to the loss of pigment producing zooxanthellae. Coral bleaching has occurred in the Caribbean, Indian, and Pacific oceans on a regular basis. Many different hypotheses exist as to the cause behind coral bleaching. Researchers have found an alarming pattern of bleaching in the reefs in Mandapam, Keezhakkarai and Palk Bay in Gulf of Mannar regions.

Causes:

1. Elevated sea temperature – This is considered to be the most common factor responsible for extensive coral bleaching. Corals grow in warm shallow waters that receive plenty of light. A few species can tolerate cooler and deeper waters. However, most coral species live in waters close to the warmest temperature they can tolerate- 29° C. This means that slight increases in ocean temperature can harm corals.
   El Nino elevates the sea temperature and destroys coral reefs. The last big El Niño in 1998 caused the worst coral bleaching in recorded history. It destroyed about 15% of the world's corals.
2. Ocean Acidification – There is a rise in carbon dioxide levels. Oceans absorb the carbon dioxide. When the uptake increases, the acidity of ocean water increases. This inhibits the corals ability to create calcareous skeletons, which is essential for their survival.
3. Solar radiation and ultraviolet radiation – UV radiation induces coral bleaching. Global warming causes changes in tropical weather patterns which results in less cloud cover and thus more radiation. In fact, reduced cloud cover also affect solar radiation.
4. Infectious Diseases causes by bacteria vibrio shiloi inhibits photosynthesis of zooxanthellae. These bacteria become more virulent with elevated sea temperatures.
5. Chemical pollution and increased elemental nutrient concentrations increase the density of zooxanthellae . Thereby lowering coral resistance to diseases.
5. Increased sedimentation due to poor land use, deforestation, dredging make the algae more prone to bleaching.
6. Human induced threats like over fishing, especially using damaging practices like cyanide fishing , pollution from agricultural and industrial runoff, coral mining, development of industrial areas near coral ecosystems are also causes. Remember, Adani's coal plant in Australia made news – it is a threat to the corals.

Consequences:

Coral reefs cover an area of over 280,000 km2 and support thousands of species, thus described as the "rainforests of the seas". Coral reefs benefit the environment and people in numerous ways.

- The death of corals and the resulting disappearance of reefs would result in the loss of a number of marine animals that rely on the reef for survival. The entire food chain gets disturbed then. The elimination of coral reefs would also result in great losses of income and resources from tourism. Corals also hold prospects as medicinal value for humans. Its a potential loss there. Coral reefs also protect coastlines by absorbing constant wave energy from the ocean, thereby protecting people living near the coast from increased storm damage, erosion and flooding.

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DAILY CURRENT AFFAIRS BASED MCQS

1. Consider the following statements w.r.t the Chagos Archipelago.
   1. It is located in the Indian Ocean.
   2. UK controls its colonial administration
   3. Recently UNSC has demanded the Archipelago to be out of colonial administration.

   Which of the above statements is/are correct?

   (a) 1 and 2
   (b) 1 and 3
   (c) 2 and 3
   (d) 1, 2 and 3
2. Consider the following statements w.r.t the Golden Card Scheme introduced by the UAE.
   1. It is a permanent residency scheme to woo wealthy individuals and exceptional talents.
   2. It may attract greater foreign investment and stimulate the local economy, making it more efficient.

   Which of the above statements is/are correct?

   (a) 1 only
   (b) 2 only
   (c) Both 1 and 2
   (d) Neither 1 nor 2
3. Consider the following statements w.r.t the Currency Chest.
   1. Currency chests are branches of selected banks authorised by the RBI to stock rupee notes and coins.
   2. Only a Scheduled Commercial Bank can function as a Currency Chest.
   3. As per the recent RBI Guidelines, the currency chests should have a Chest Balance Limit (CBL) of Rs 1,000 crore.

   Which of the above statements is/are correct?

   (a) 1 and 2
   (b) 1 and 3
   (c) 2 and 3
   (d) 1, 2 and 3
4. Consider the following statements w.r.t Coral Reefs.
   1. Corals control the level of carbon dioxide in the water by converting it into a limestone shell.
   2. When the sea surface temperature increases beyond a tolerable limit, they undergo a process called Coral Bleaching

   Which of the above statements is/are incorrect?

   (a) 1 only
   (b) 2 only
   (c) Both 1 and 2
   (d) Neither 1 nor 2
5. Consider the following statements w.r.t Artemis Mission.
   1. Artemis 1 will be an uncrewed mission around the planet Mars planned for 2020.
   2. This mission uses two of the five in-orbit spacecraft from another NASA Heliophysics constellation of satellites (THEMIS)

   Which of the above statements is/are incorrect?

   (a) 1 only
   (b) 2 only
   (c) Both 1 and 2
   (d) Neither 1 nor 2

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