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Daily News Discussion (DND)

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1. Geography

1.1. Genomes in Indian Ocean

About

- A 30-member team of scientists and researchers from the National Institute of Oceanography (NIO) in Panaji and another 30 crew members onboard its research vessel Sindhu Sadhana will spend the next three months traversing the course of over 10,000 nautical miles in the Indian Ocean on a research project to reveal the internal working of the body of the ocean at a cellular level.
- The first-of-its-kind research project in the country is aimed at understanding the biochemistry and the response of the ocean to climate change, nutrient stress and increasing pollution.
- The project will take three years to complete.

What is the NIO's research project about?

- The research project that will be flagged off at Visakhapatnam – course the Indian Ocean from India's east coast, all the way to Australia, then onward towards Port Louis in Mauritius and up to the border of Pakistan, off India's west coast.
- They will gather samples for genome mapping of microorganisms in the Indian Ocean. The researchers will collect samples from various stretches of the ocean at an average depth of about 5 km.
- The scientists will map these in the bacteria, microbes found in the ocean.
- The mapping of the Deoxyribonucleic acid (DNA) and Ribonucleic acid (RNA) will show the nutrients present in them, and also those lacking in different parts of the ocean

Objective of studying the interactions of trace metals and marine plant and animal life

- Trace metals like cadmium or copper are supplied to oceans via continental run-offs, atmospheric deposition, hydrothermal activities and continental shelf interaction. They are essential for ocean productivity.
- For having a holistic understanding about nutrient cycling and productivity of the oceans
- Trace metals can be utilised to track the movement of water masses responsible for ocean circulation and as tools to study the biological, geochemical and ecosystem processes and food web analyses.
- Help to generate new information about trace metals from underexplored regions of the Indian Ocean.

Significance

- Will enable scientists to identify the factors controlling the changes in RNA, DNA in the oceans, and various stressors impacting them.
- The ocean has several micronutrients like nitrates, sulphates and silicates, minerals like iron ore and zinc, and trace metals like cadmium or copper. The genome mapping will show the presence of which these microbes have adapted to, in addition to their reaction to atmospheric carbon dioxide.

- This will help in identifying which part of the ocean has a greater concentration of which mineral or element.
- Scientists will then use these as tracers to tackle the causative factors for excess or lack of a certain mineral or element and suggest possible solutions for their mitigation.
- In addition, the large pool of RNA, DNA library of the oceans will be utilised for using the Indian Ocean to human benefit in the future.
- Exploring the ocean genome will enable an increase in the growing number of commercial biotechnology applications, extending from multiple anticancer treatments to cosmetics and industrial enzymes, to antiviral molecules

National Institute of Oceanography

- Is a multi-disciplinary oceanographic research institute and is one of the constituent laboratories of the (CSIR), New Delhi

Council of Scientific and Industrial Research (CSIR)

- is a research and development (R&D) organisation in India established in September 1942
- funded by the Ministry of S&T
- Operates as an autonomous body through the Societies Registration Act, 1860.
- President: Prime Minister of India (Ex-officio)
- Vice President: Union Minister of Science and Technology (Ex-officio)

1.2.Martian blueberries

About

- In 2004, NASA's Mars exploration rover 'Opportunity' found several small spheres on the planet, informally named Martian blueberries.

Evidence of water

- Studies noted that blueberries were made of iron oxide compounds called haematites. This caused excitement, as the presence of haematites suggests that there was water present on Mars.
- The widely accepted formation mechanism of haematite concretion [hard solid mass] is precipitation from aqueous fluids.
- Haematite is known to form in oxidising environments, and based on our experience on Earth, we infer that water must have also played a crucial role in the formation of grey haematite on Mars.

Connection with haematite concretions in Kutchh

- The team has been studying the Jhuran formation in Gujarat which is between 145 and 201 million years old. Detailed geochemistry and spectroscopic investigations of the haematite concretions in this area revealed that they resemble the ones on Mars.
- They have similar morphology – spherical, often doublet and triplet – and similar mineralogy – a mixture of haematite and goethite.

Martian oxygen

- The haematites on Mars not just show the presence of water, they also indicate that the planet had an atmosphere with oxygen as haematites need oxygen to stabilise.
- It is not known if the concentration was high enough to permit lifeforms, but there was indeed more oxygen than the present day scenario..
- About the age of the 'blueberries' on Mars, the exact time correlation is not possible. Water is believed to have disappeared from Mars rocks about three billion years ago.

1.3.Sangay Volcano eruption

- Ecuador's Sangay volcano erupted on recently, spewing clouds of ash as high as 8,500 meters (about 28, 890 feet) into the sky.
- Sangay volcano is one of the highest active volcanoes in the world and one of Ecuador's most active ones.

Volcano	Country	Eruption Start Date	Eruption Stop Date
Raung	Indonesia	2021 Jan 21	2021 Jan 28 (continuing) -
Sarychev Peak	Russia	2021 Jan 7	2021 Jan 28 (continuing) -
Merapi	Indonesia	2020 Dec 31	2021 Jan 28 (continuing) -
Soufriere St. Vincent	Saint Vincent and the Grenadines	2020 Dec 27	2021 Jan 28 (continuing) -
Kilauea	United States	2020 Dec 20	2021 Jan 28 (continuing) (
Lewotolo	Indonesia	2020 Nov 27	2021 Jan 28 (continuing) -
Sinabung	Indonesia	2020 Aug 8	2021 Jan 28 (continuing) -
Langila	Papua New Guinea	2020 Aug 1	2021 Jan 28 (continuing) -
Karymsky	Russia	2020 Apr 1	2021 Jan 28 (continuing) -

Volcano

- A volcano is a vent or a fissure in the crust from which lava (molten rock), ash, gases, rock fragments erupt from a magma chamber below the surface. Volcanism is the phenomenon of eruption of molten rock, pyroclastics and volcanic gases to the surface through a vent.

Causes

- here is a huge temperature difference between the inner layers and the outer layers of the earth due to the differential amount of radioactivity.
- This temperature difference gives rise to convectional currents in the mantle.
- The convection currents in the mantle create convergent and divergent boundaries (weak zones).
- At the divergent boundary, molten, semi-molten and sometimes gaseous material appears on earth at the first available opportunity.
- The earthquakes here may expose fault zones through which magma may escape (fissure type volcano).
- At the convergent boundary, the subduction of denser plate creates magma at high pressure which will escape to the surface in the form of violent eruptions.

Volcanism Lava types

- Andesitic or Acidic or Composite or Stratovolcanic lava
 - ✓ These lavas are highly viscous with a high melting point.
 - ✓ They are light-coloured, of low density, and have a high percentage of silica.
 - ✓ They flow slowly and seldom travel far before solidifying.
 - ✓ The resultant volcanic cone is therefore stratified (hence the name stratovolcano) and steep-sided.
 - ✓ The rapid solidifying of lava in the vent obstructs the flow of the out-pouring lava, resulting in loud explosions, throwing out many volcanic bombs or pyroclasts.
 - ✓ Sometimes the lavas are so viscous that they form a lava plug at the crater like that of Mt. Pelée in Martinique (an island in the Lesser Antilles, Caribbean Islands).
 - ✓ Andesitic lava flow occurs mostly along the destructive boundaries (convergent boundaries).
- Basic or Basaltic or Shield lava
 - ✓ These are the hottest lavas, about 1,000 °C and are highly fluid.
 - ✓ They are dark coloured basalt, rich in iron and magnesium but poor in silica.
 - ✓ They flow out of volcanic vent quietly and are not very explosive.
 - ✓ Due to their high fluidity, they flow readily with a speed of 10 to 30 miles per hour.
 - ✓ They affect extensive areas, spreading out as thin sheets over great distances before they solidify.
 - ✓ The resultant volcano is gently sloping with a wide diameter and forms a flattened shield or dome.
 - ✓ Shield type lava flow is common along the constructive boundaries (divergent boundary).

2. Polity

2.1. Official Panel on India's Low Press Freedom Rank

- A committee set up by the government last year to suggest ways of India improving its ranking in the World Press Freedom Index has concluded that the media is doing well and that India's poor score – which it says is “not in line with the ground situation” – is the product of “western bias”
- In 2020, the Paris-based Reporters Without Borders (RSF) ranked India 142nd among 180 countries on the World Press Freedom Index 2020. India's rank has fallen steadily over the past decade. And for a country that obsessively compares itself with its western neighbour, it is now merely three places ahead of Pakistan, which stands at 145. In 2006, India's rank was 106.
- Taking note of the RSF report, the Narendra Modi government set up a committee – called the ‘Index Monitoring Cell’ (IMC) – to work on “improving India's ranking on the freedom of press index

Proposals

- Definition of a journalist and journalism practice: “Setting and following the definition of a journalist that merges the two viewpoints – the legal and the ethical – is recommended to ensure that the best interests of the public and of the newsroom are served.”
- Establishment of Media Council of India: “...the need for a Media Council of India is felt for the entire gamut of media, i.e., newspapers and periodicals in print or other form, e-newspapers, news portals, social media and any other platform of news dissemination besides electronic media. In 2019, the PCI had also recommended enacting a single legislation to include all the aforesaid media in line of the Press Council Act 1978.”
- Legal and Administrative Security for Journalists: “consider decriminalisation of the offence of defamation; consider a review various archaic and colonial laws impacting press freedom in India; consent of the Press Council of India may be made mandatory for filing an FIR against a media; time-bound investigation and filing of chargesheet by police authorities may be made mandatory in matters related to journalistic expression
- Financial Security of Journalists: “Take the draft ‘Journalists Welfare Fund Act’, proposed by the Press Council of India in 2015, forward; consider enacting a single legislation/scheme for the welfare of journalists
- Physical safety of Journalists: “Provision of bullet-proof identifiable jackets, helmets, etc. wherever required. The concerned organization should take responsibility for those journalists who are deployed to cover disturbed or conflict regions; Insurance schemes for media persons working in life-threatening circumstances; Access to welfare measures and schemes announced by Union and State Governments
- Engagement with Industry Representatives and Media Associations: organise ‘outreach’ with media houses and Media Associations., consider organizing an annual Indian media conclave
- Re-skilling and ups killing of journalists: Online capacity building courses may be offered for journalists; frequent workshops and other short-duration programmes would aid in capacity building of the industry.

- Coordination with other line Ministries/Departments: I&B ministry may coordinate with law ministry on legal amendments; with home ministry regarding sensitisation of police; with the Ministry of External Affairs regarding engagement with international ranking agencies and obtaining feedback from foreign journalists in India
- Widening the ambit of accreditation: Compile a complete list of working journalists in the field throughout the country; benefits associated with accreditation may be extended to journalists working in smaller organizations in even Tier 2 and Tier 3 cities and towns.
- Engagement with International Media Ranking agencies: “establish a regular engagement with international media ranking agencies to ... present the correct factual position of the status of press freedom in India and convey... the unique socio-cultural complexities of India and the national security imperative in light of internal and external threats.”
- Communication Strategy: Implement three-pronged communication strategy related to the Press Freedom Index may be implemented by the Ministry featuring “engagement with Industry Representatives and Media Associations, Positive Aspects with regard to Press Freedom in India at national and global level: publicizing reform actions taken towards enhancing press freedom in India”.
- Developing an India specific Index: NITI Aayog has suggested creating certain indices to promote competition amongst the States... more discussion is required for deciding whether such indices for ranking of states would achieve the desired goal.

World Press Freedom Index 2020

- India has dropped to two places on the World Press Freedom Index, 2020 to be ranked 142nd out of 180 countries.
- First-Norway
- Pakistan -145
- Bangladesh -151
- China -177
- Reporters Sans Frontiers (RSF) or Reporters Without Borders.
- independent NGO with consultative status with the UNESCO,

Parameters

- pluralism, media independence, media environment and self-censorship, legislative framework, transparency, and the quality of the infrastructure that supports the production of news and information.

World Press Freedom Index 2020

- Reasons
 - ✓ Pressure on the media
 - ✓ The "coordinated hate campaigns" waged on social networks against journalists who dare to speak or write about subjects that annoy Hindutva followers.

Improvement

- With no murders of journalists in India in 2019, as against six in 2018, the security situation for the country's media might seem, on the face of it, to have improved

2.2.LGBTIQ Freedom Zone in EU

- In a resolution adopted recently, the European Parliament symbolically declared the entire 27-member bloc as an “LGBTIQ Freedom Zone” – the acronym meaning lesbian, gay, bisexual, trans, non-binary, intersex and queer
- The European Union resolution declares that the “LGBTIQ persons anywhere in European Union will enjoy the freedom to live and publicly show their sexual orientation & gender identity without any fear of intolerance, persecution or discrimination”.
- The resolution further adds that, the authorities at all the levels of the governance across the European union shall protect and promote the equality and fundamental rights of all including the LGBTIQ.
- A majority of countries in the EU (23/27) recognise same-sex unions, with 16 legally recognising same-sex marriage.
- Same-sex relationships are not legally recognised in Poland,
- The Hungarian and Poland authorities have described LGBTIQ principles of governance as “foreign” ideology.

Sec 377 of IPC

- Section 377 of the Indian Penal Code (IPC) is an act that criminalizes homosexuality and was introduced in the year 1861 during the British rule of India.
- Referred to ‘unnatural offences’ and says whoever voluntarily has carnal intercourse against the order of nature with any man, woman or animal, shall be punished with imprisonment for life.

Supreme Court of India

- on September 6, 2018, decriminalized Section 377 of the IPC and allowed gay sex among consenting adults in private.
- The SC ruled that consensual adult sex is not a crime saying sexual orientation is natural and people have no control over it.
- It also said that Section 377 remains in force relating to sex with minors, non-consensual sexual acts, and bestiality.

Transgender Persons (Protection of Rights) Act, 2019.

- Definition of a transgender person: defines a transgender person as one whose gender does not match the gender assigned at birth. It includes trans-men and trans-women, persons with intersex variations, gender-queers, and persons with socio-cultural identities, such as kinnar and hijra. Intersex variations is defined to mean a person who at birth shows variation in his or her primary sexual characteristics, external genitalia, chromosomes, or hormones from the normative standard of male or female body

- Prohibition against discrimination: prohibits the discrimination against a transgender person, including denial of service or unfair treatment in relation to: (i) education; (ii) employment; (iii) healthcare; (iv) access to, or enjoyment of goods, facilities, opportunities available to the public; (v) right to movement; (vi) right to reside, rent, or otherwise occupy property; (vii) opportunity to hold public or private office; and (viii) access to a government or private establishment in whose care or custody a transgender person is.

Right of residence

- Every transgender person shall have a right to reside and be included in his household. If the immediate family is unable to care for the transgender person, the person may be placed in a rehabilitation centre, on the orders of a competent court.

Employment:

- No government or private entity can discriminate against a transgender person in employment matters, including recruitment, and promotion. Every establishment is required to designate a person to be a complaint officer to deal with complaints in relation to the Act.

Certificate of identity for a transgender person

- A transgender person may make an application to the District Magistrate for a certificate of identity, indicating the gender as 'transgender'. A revised certificate may be obtained only if the individual undergoes surgery to change their gender either as a male or a female.
- It also requires transgender persons to go through a district magistrate and "district screening committee" to get certified as a transperson.
- Composition: The committee would comprise a medical officer, a psychologist or psychiatrist, a district welfare officer, a government official, and a transgender person.
- Offences and penalties: The Bill recognizes the following offences against transgender persons: (i) forced or bonded labour (excluding compulsory government service for public purposes), (ii) denial of use of public places, (iii) removal from household, and village, (iv) physical, sexual, verbal, emotional or economic abuse. Penalties for these offences vary between six months and two years, and a fine.
- National Council for Transgender persons (NCT): The NCT will consist of: (i) Union Minister for Social Justice (Chairperson); (ii) Minister of State for Social Justice (Vice- Chairperson); (iii) Secretary of the Ministry of Social Justice; (iv) one representative from ministries including Health, Home Affairs, and Human Resources Development. Other members include representatives of the NITI Aayog, and the National Human Rights Commission. State governments will also be represented. The Council will also consist of five members from the transgender community and five experts from non-governmental organisations.

Criticism

- No provision for granting reservations to transgender persons.
- It has prescribed punishments for organised begging
- Does not mention any punishments for rape or sexual assault of transgender persons as according to Sections 375 and 376 of the Indian Penal Code, rape is only when a man forcefully enters a woman

Important Supreme court judgements

- Navtej Singh Johar vs. Union Of India (2018):
 - ✓ decriminalised homosexuality.
- Shafin Jahan v. Asokan K.M. and others (2018):
 - ✓ The Supreme Court observed that choice of a partner is a person's fundamental right, and it can be a same-sex
- Same-sex Marriage:
 - ✓ In February, 2021, the Central Government opposed same-sex marriage in Delhi High Court stating that a marriage in India can be recognised only if it is between a "biological man" and a "biological woman" capable of producing children.

2.3.Places of Worship (Special Provisions) Act, 1991

- The Supreme Court asked the Centre to respond to a plea challenging the Places of Worship (Special Provisions) Act, 1991 which freezes the status of places of worship as it was on 15th August, 1947.
- The Act was passed in September 1991, over a year before the demolition of the Babri Masjid (1992).
- Section 4(2)
 - ✓ all suits, appeals or other proceedings regarding converting the character of a place of worship (that were pending on 15th August, 1947) will come to end when the Act commences and no fresh proceedings can be filed.
- Section 3
 - ✓ bans the conversion of a place of worship or even a section of it into a place of worship of a different religious denomination or of a different segment of the same religious denomination.
- Section 6
 - ✓ prescribes a punishment of maximum three-years imprisonment along with a fine for contravening the provisions of the Act.
 - ✓ The Act also imposes a positive obligation on the State to maintain the religious character of every place of worship as it existed at the time of Independence.

Exemption

- Section 5
 - ✓ Exempts the legal proceedings in relation to Shri Ramjanmabhoomi from the application of the Act. This is recognised by the Supreme Court itself in Paragraph 80 of the Ayodhya judgment.
 - ✓ The Act also does not apply to any place of worship which is an ancient and historical monument or an archaeological site covered by the Ancient Monuments and Archaeological Sites and Remains Act, 1958.

3. Environment

3.1. Bihar government bans sand mining near river bridges

Impact of Sand mining

River degradation

- Excessive instream sand-and-gravel mining causes the degradation of rivers. Instream mining lowers the stream bottom, which may lead to bank erosion. Depletion of sand in the streambed and along coastal areas causes the deepening of rivers and estuaries, and the enlargement of river mouths and coastal inlets.

Ecosystem

- All species require specific habitat conditions to ensure long-term survival. Native species in streams are uniquely adapted to the habitat conditions that existed before humans began large-scale alterations.
- These have caused major habitat disruptions that favored some species over others and caused overall declines in biological diversity and productivity.
- In most streams and rivers, habitat quality is strongly linked to the stability of channel bed and banks.
- Unstable stream channels are inhospitable to most aquatic species

Groundwater

- Apart from threatening bridges, sand mining transforms the riverbeds into large and deep pits; as a result, the groundwater table drops leaving the drinking water wells on the embankments of these rivers dry.
- Bed degradation from instream mining lowers the elevation of streamflow and the floodplain water table which in turn can eliminate water table-dependent woody vegetation in riparian areas, and decrease wetted periods in riparian wetlands.
- For locations close to the sea, saline water may intrude into the fresh waterbody

Water Quality

- Impacts include increased short-term turbidity at the mining site due to resuspension of sediment, sedimentation due to stockpiling and dumping of excess mining materials and organic particulate matter, and oil spills or leakage from excavation machinery and transportation vehicles.
- Recently Ministry of Environment released guidelines to monitor and check illegal sand mining in the country. (2020)
- The previous Sustainable Sand Management Guidelines (SSMG), 2016 focus on the management of sand mining, but there was a need to have guidelines for effective enforcement of regulatory provisions and their monitoring.
- Sustainable Sand Mining Guidelines, 2016, require the preparation of District Survey Reports (DSR), which is an important initial step before grant of mining lease, the government has found that the DSRs carried out by state and district administrations are often not comprehensive enough, allowing space for illegal mining.

- The new guidelines, therefore, list a detailed procedure of how the DSRs are to be made, including the development of an inventory, for the first time, of river bed material and other sand sources in the district.

Key guidelines

- States to carry out river audits
- Monitor mining with drones and night surveillance of mining activity through night-vision drones
- Online sales and purchase of sand and other riverbed materials (RBM) for transparency in the process
- Directions to states to set up dedicated task forces at district levels.
- In cases where rivers become district boundaries or state boundaries, the districts or states sharing the boundary shall constitute the combined task force for monitoring of mined materials, mining activity and participate in the preparation of District Survey Reports (DSR) by providing appropriate inputs.
- No riverbed mining will be allowed during the monsoon.

Basics

- Minor Minerals (Eg building stones, ordinary sand)
 - ✓ Notify by Central Government notifies from time to time for which the absolute powers for deciding on procedures of seeking applications for and granting mineral concessions, fixing rates of royalty, dead rent, and power to revise orders rest only with the State Government.
- First schedule Minerals (eg coal, Uranium, Thorium etc)
 - ✓ Minerals specified in the First Schedule to the Mines and Minerals (Development and Regulation) Act, 1957 approval of the Central Government is necessary.
- The Mines and Minerals (Development and Regulation) Act, 1957 has empowered state governments to make rules to prevent illegal mining, transportation and storage of minerals
- State list
 - ✓ Mandates the state government to own the minerals located within their boundaries.
- Central list
 - ✓ Mandates the central government to own the minerals within the exclusive economic zone of India (EEZ).
 - ✓ In pursuance to this Mines & Minerals (Development and Regulation) (MMDR) Act of 1957 was framed.

3.2. Energy Efficiency Enterprise (E3) Certifications programme for brick sector

About E3 Scheme

- E3 Certification Scheme seeks to accelerate brick sector modernization, using market incentives to create customer demand to fulfil the vision for Aatmanirbhar Bharat.

- By availing E3 Certification, the brick units shall shift towards adoption of more efficient technologies for making energy efficient bricks. Such bricks will be useful in complying the requirements of Energy Conservation Buildings Code (ECBC)
- The E3 Certificate will be awarded to those enterprises whose specific energy consumption will be 25% lower than the national baseline.
- The enterprises can qualify for E3 through adoption of energy efficient brick manufacturing process and technology and Production of lower density bricks (hollow, perforated or porous bricks).
- Adoption of the E3 Certification is currently voluntary for the Brick industry.
- This will push towards phasing out of inefficient technology in Brick production and enhance awareness and access of energy efficient bricks and technology.

Bureau of Energy Efficiency (BEE)

- Statutory body, set up in 2002 under the provision of the Energy Conservation Act, 2001.

ECO NIWAS

- Ministry of Power has launched the Energy Conservation- New Indian Way for Affordable & Sustainable Homes (ECO Niwas) Samhita 2018, an Energy Conservation Building Code for Residential Buildings (ECBC-R) to give a further fillip to India's energy conservation efforts
- Energy Conservation Building Code (ECBC) was launched in 2007 by the BEE to set energy efficiency standards for design and construction of buildings as a first step towards promoting energy efficiency in the building sector.

4. Science and technology

4.1. What is 2001 FO32, the largest asteroid passing by Earth this year?

- Recently, the largest asteroid predicted to pass by Earth in 2021 will be at its closest. It won't come closer than 2 million km to Earth, but it will present a valuable scientific opportunity for astronomers who can get a good look at a rocky relic that formed at the dawn of our Solar System..
- It was discovered in March 2001 by the Lincoln Near-Earth Asteroid Research (LINEAR) program in Socorro, New Mexico.

About 2002 F032

- The speed of Asteroid is faster than the speed at which most asteroids encounter Earth.
- due to its close approach to the earth
- It is in a highly eccentric orbit around the Sun.
- It completes one orbit every 810 days (about $2\frac{1}{4}$ years).
- The orbit is tilted 39° to Earth's orbital plane.
- This orbit takes the asteroid closer to the Sun than Mercury
- The near-Earth asteroid will make its closest approach at a distance of about 2 million km or $5\frac{1}{4}$ times the distance from Earth to the Moon.
- The distance is close in astronomical terms, that's why it has been designated a "potentially hazardous asteroid".

Near-Earth Objects (NEOs)

- are comets and asteroids that have been nudged by the gravitational attraction of nearby planets into orbits that allow them to enter the Earth's neighborhood.
- Composed mostly of water ice with embedded dust particles, comets originally formed in the cold outer planetary system while most of the rocky asteroids formed in the warmer inner solar system between the orbits of Mars and Jupiter.

Potentially Hazardous Asteroids (PHAs)

- are currently defined based on parameters that measure the asteroid's potential to make threatening close approaches to the Earth. Specifically, all asteroids with a minimum orbit intersection distance (MOID) of 0.05 au or less and an absolute magnitude (H) of 22.0 or less are considered PHAs.
- In other words, asteroids that can't get any closer to the Earth (i.e. MOID) than 0.05 au (roughly 7,480,000 km or 4,650,000 mi) or are smaller than about 150 m (500 ft) in diameter (i.e. H = 22.0 with assumed albedo of 13%) are not considered PHAs.
- This "potential" to make close Earth approaches does not mean a PHA will impact the Earth. It only means there is a possibility for such a threat. By monitoring these PHAs and updating their orbits as new observations become available, we can better predict the close-approach statistics and thus their Earth-impact threat.

- Minimum Orbit Intersection Distance is a method for calculating the minimum distance between two almost overlapping elliptical orbits

Lagrange Points

- are positions in space where objects sent there tend to stay put. At Lagrange points, the gravitational pull of two large masses precisely equals the centripetal force required for a small object to move with them.
- This mathematical problem, known as the "General Three-Body Problem"
- There are five special points where a small mass can orbit in a constant pattern with two larger masses.
- Of the five Lagrange points, three are unstable and two are stable. The unstable Lagrange points - labeled L1, L2 and L3 - lie along the line connecting the two large masses. The stable Lagrange points - labeled L4 and L5 - form the apex of two equilateral triangles that have the large masses at their vertices

Significance

- These points in space can be used by spacecraft to reduce fuel consumption needed to remain in position
- The L1 point of the Earth-Sun system affords an uninterrupted view of the sun and is currently home to the Solar and Heliospheric Observatory Satellite
- L2 is ideal for astronomy because a spacecraft is close enough to readily communicate with Earth, can keep Sun, Earth and Moon behind the spacecraft for solar power and (with appropriate shielding) provides a clear view of deep space for our telescopes.
- The L1 and L2 points are unstable on a time scale of approximately 23 days, which requires satellites orbiting these positions to undergo regular course and attitude corrections.
- NASA is unlikely to find any use for the L3 point since it remains hidden behind the Sun at all times. The idea of a hidden planet has been a popular topic in science fiction writing.
- Objects found orbiting at the L4 and L5 points are often called Trojans after the three large asteroids Agamemnon, Achilles and Hector that orbit in the L4 and L5 points of the Jupiter-Sun system.

Current affairs Worksheet (15 March 2021)

Factual sheet for Quick revision

Topic	Description	Update
Environ ment	Sand mining & impact Sand mining guidelines Minor vs major minerals E3 Certification & BEE	
SnT	Potentially Hazardous Asteroids (PHAs) Lagrange Points	
Geog	Genome in Indian ocean CSIR Martian blueberries Volcano location	
Polity	Freedom of press index Gandhi's Ashram and News paper LGBTIQ Sec 377 Transgender act 2019 Places of worship act	