2nd WEEK FEBRUARY 2023 CURRENT AFFAIRS

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GS I: Modern Indian History

TREATY OF ALINAGAR

1.Background

The Treaty of Alinagar, signed on February 9, 1757, was a reluctant agreement signed by Bengal's Nawab Siraj ud Daula with the English East India Company

Image Source: Britanica

2. A trading company comes to India

1. The English East India Company (henceforth referred to as 'the Company') was formed in 1600 by a royal charter
2. The charter gave the Company monopoly of all trade from England in the East and the right to carry gold bullion to finance its activities, with the aim of combating growing Dutch influence in the East

3. The Company formally began trading with India in 1613, supported by a royal *farman* from Mughal emperor Jehangir which allowed the Company to open its factories and warehouses
4. Till the middle of the 18th century, the Company worked with local rulers, often subservient to them, and established a thriving business
5. While over time it had acquired control of various trading posts on both sides of the coast, the Company was yet to engage in a concerted effort to expand its territories

3.Bengal as a trading town

- The three primary trading towns where thriving British communities emerged by the 18th century were Bombay, Madras and Calcutta
- Of these, Calcutta was the most important, as by the 18th century, goods from Bengal comprised nearly 60 per cent of all English imports from Asia
- It was Mughal emperor Aurangzeb who gave the Company the right to trade in Bengal for an annual payment of Rs 3000
- After his death in 1707, the Mughal Empire started to crumble. Those who were previously subordinate to the Mughal crown started vying for autonomy.
- While the Mughal emperor remained the symbolic head across much of the erstwhile Mughal heartland, his actual power was fast diminishing
- This was a problem for the British, who relied on the legitimacy of the Mughal crown to carry out trade, unhindered
- When another *farmaan* from the Mughal emperor Farrukhsiyar in 1917 established favourable terms for the Company to continue its trade in Bengal, this was met with local opposition
- Nawab Murshid Quli Khan, the new autonomous ruler of Bengal, refused to extend the 1917 *farmaan*'s duty-free provision to cover also the private trade of the Company officials
- He also denied permission to the Company to buy the thirty-eight villages and refused to offer minting privileges to the British

4.Siraj ud daula

- In 1755, vary of French competition, the English began renovating the fortifications in Calcutta without the Nawab's permission

- The situation was already tense when matters took a turn for the worse in 1756. An Indian trader named Krishna Ballabh took refuge inside the renovated Fort William in Calcutta
- He had been charged with cheating by the new Nawab, Siraj ud Daula. This was a major provocation and the young Nawab threatened military action as well as a crackdown on the Company's business
- When the Company failed to listen to warnings, Siraj showed his strength by taking over the Company factory at Cossimbazar
- A few weeks later, the Nawab's forces would attack Fort William, capturing Calcutta on June 20. They would ransack the city and the Nawab would shortly rename it Alinagar
- However, the Nawab's position was far weaker than his easy takeover of Calcutta made it seem. Not only did he face a large Company force on its way to Bengal from Madras under Robert Clive, there was also the looming threat of the Afghans under Ahmad Shah Abdali who had already caused havoc in the Northern territories of the weak Mughal Empire
- A surprise attack by the Company forces defeated the Nawab's forces outside Calcutta in early 1757

5.Treaty of Alinagar

- Under the threat of an impending Afghan assault and under advice from his ministers, the Nawab reluctantly decided to sign a treaty with the Company on February 9, 1757: **the Treaty of Alinagar**
- This treaty restored all the privileges that Farrukhsiyar's 1717 *farmaan* had granted to the East India Company, allowing it to carry out duty-free trade, build further fortifications and operate a mint
- The story of the Treaty of Alinagar is a story of the eventual rise of the East India Company as a political force to be reckoned with
- Though the treaty ostensibly maintained the sovereignty of the Nawab of Bengal, its terms were extremely favourable to the Company
- Finally, on June 23, 1757, Robert Clive's army met the Nawab's once again, in the famous Battle of Plassey
- Though outnumbered, the Company won a decisive victory, thanks to defections from senior commanders of the Nawab's army, including the infamous Mir Jafar

- Historians point to the Company's victory in Plassey as the moment when the East India Company became a proper colonial enterprise, interested not just in trade, but territorial control that would serve its economic interests
- For most Indians, the history of British colonial rule in India begins in Plassey. However, the roots of it were sown long back. While the Treaty of Alinagar itself might be relegated to a minor footnote in history, understanding what led up to it provides much greater perspective of the machinations of early colonial expansion in India

GS I: Medieval Indian History

VIJAYANAGARA EMPIRE

1. Context

Salman Rushdie's latest novel, Victory City is a fictionalised telling of the story of the Vijayanagara Kingdom, narrated by a sorceress and poet named Pampa Kampana, who over more than two centuries, witnessed Vijayanagar's many victories and defeats.

2. About the Vijayanagara kingdom

- The Vijayanagara kingdom has long been a subject of historical and political interest.
- From their capital, now known as Hampi, on the banks of the Tungabhadra River, the Kings of Vijayanagara at the peak of their power ruled over a territory of more than 3, 60, 000 sq. km.
- Founded in 1336, the kingdom of Vijayanagara lasted for more than three centuries a period in which it withstood multiple political stresses and saw significant advances in art and economy.

3. Most powerful kingdoms in the sub-continent

- Throughout its existence from 1336 to 1646, the kingdom saw various ups and downs.
- Founded by **Harihara I of the Sangama Dynasty**, Vijayanagara expanded from a strategic position on the banks of the Tungabhadra River.
- By the 15th century, it had become a force to reckon with.
- The Kingdom reached its peak under **Krishna Deva Raya (reign 1509-1529)** a period in which it enjoyed military superiority over its rival kingdoms such as the **Bahmani Sultanate, the Golconda Sultanate and the Gajapatis of Odisha.**
- At its peak, the kingdom stretched from Goa on the Konkan coast to parts of southern Odisha in the east and to the very tip of the subcontinent in the south.

4. The economy of the kingdom

- The foundations of the kingdom rested on its thriving trade and a monetised economy.
  While the economy of the kingdom was largely dependent on agriculture, trade thrived in its many ports on either coast.
- **Traveller Abd al-Razzaq Samarqandi** chronicled how "the ports of Mangalore, Honavar, Bhatkal, Barkur, Cochin, Cannanore, Machilipatnam and Dharmadam saw traders from Africa, Arabia, Aden, the Red Sea, China and Bengal and also served as shipbuilding centres".

The empire's principal exports were pepper, ginger, cinnamon, cardamom, myrobalan, tamarind timber, ana fistula, precious and semi-precious stones, pearls, musk, ambergris, rhubarb, aloe, cotton cloth and porcelain.

- Razzaq also chronicled the high degree of monetisation in the Vijayanagara kingdom.
- In his classic History of South India, K A Nilakanta Sastri wrote that coins were minted by the state as well as by merchant guilds using **gold, silver, copper and brass** and their value depended on material weight.

5. Vijayanagar's contributions to culture and architecture

- Vijayanagar's contributions to culture and architecture were very significant.

- This was a period when poetry and scholarship flourished, both in sacral and secular contexts.
- **Literature** in **Tamil, Telugu, Kannada, as well as Sanskrit,** was produced in the kingdom, with new writing styles and methods emerging.
- In architecture, Vijayanagara saw various enduring constructions.
- According to art historian Percy Brown, Vijayanagara architecture is a vibrant combination and the blossoming of the **Chalukya, Hoysala, Pandya and Chola styles**, idioms that prospered in previous centuries.
- The **Prasanna Virupaksha Temple of Bukka I** and **the Hazara Rama Temple of Krishna Deva Raya** are striking examples of Vijayanagara's characteristic style and intricate artistry.

6. Vijayanagara's capital Hampi

- Vijayanagara's capital Hampi is a UNESCO World Heritage Site today, known for its sophisticated fortifications as well as innumerable temples and other architectural marvels.
- From accounts of foreign travellers, by the beginning of the 16th century, Hampi-Vijayanagara was probably the second-largest urban settlement on the planet (after Beijing) and among the most prosperous.

7. The last bastion of Hindu rule in the South

- A lasting theme in Vijayanagara's historiography has been its characterisation as "a Hindu bulwark against Muhammadan conquests".
- From Robert Sewell's classic **A Forgotten Empire** (1900) to Nilakanta Sastri's 1955 **magnum opus**, this characterisation has persisted over the years and has been influential in the writing of the story of Vijayanagara.
- The dreaded invaders reached the Krishna River the Hindus to their south, stricken with terror, combined and gathered in haste to the new standard of Vijayanagara which alone seemed to offer some hope of protection.
- The decayed old states crumbled away into nothingness and the fighting kings of Vijayanagara became the saviours of the south for two and a half centuries.
- Vijayanagara has been remembered as an era of "**cultural conservatism**", when classical forms of Hinduism were preserved amidst the growing Islamization of the rest of the subcontinent, especially the North.

GS I: Indian heritage & Culture

AHMADIYYAS

1. Context

Unknown attackers broke the domes and minarets of a mosque of Pakistan's minority Ahmadiyya community in Karachi, Pakistan, recently. In videos shared on social media, people were seen climbing atop an Ahmadi Masjid in Saddar, Karachi and raining hammer blows on the structure. This attack is another in a string of attacks that have taken place on Ahmadiyya places of worship in Pakistan.

2. Who are Ahmadiyyas?

- The origins of the religious sect are in Qadian near Amritsar in Punjab, India. Mirza Ghulam Ahmad founded the movement in 1889.
- In opposition to some aspects of Islam, he preached that he was the promised messiah who had the task of bringing God's teaching into harmony with the present-day world.
- He said this coming was awaited not only by Muslims out by Christians and Jews as well.
- There are around 2-5 million Ahmadis in Pakistan. The community is also present in India, and some estimate their numbers at around 1 lakh.
- The sect has long been opposed by hardline Muslim clerics, some of whom consider Ahmadiyyas to be heretics. However, Ahmadiyyas do not dispute the centrality of the Prophet in their religion.

3. Issue of Ahmadiyyas in Pakistan

- The Ahmadiya community faces frequent attacks and persecution in Pakistan. The Human Rights Commission of Pakistan (HRCP) has previously strongly condemned the desecration of an Ahmadiyya worship site in Punjab province's Wazirabad District and called for the protection of such spaces for religious minorities in the country.

- Issues of desecration often relate to the removal of minarets from Ahmadiyya mosques. The presence of a minaret is considered to be giving the religious place the position of a mosque which is opposed by many in Pakistan and is also penalized in law.
- In 1974, Pakistan's Prime Minister Zulfikar Ali Bhutto enacted an amendment to the Constitution, declaring Ahmadiyyas to be non-Muslims. Flowering from this, they were barred from going to mosques.

4. Restrictions on Ahmadiyyas Freedom

- According to a document of the Office of the United Nations High Commissioner for Human Rights, the military dictator Zia-ul-Haq's 1984 ordinance introduced explicit discriminatory references to Ahmadiyyas in Sections 298-B and 289-C of the Pakistan Penal Code (PPC).
- There are significant restrictions on Ahmadiyya's freedom of religion and expression, and violations could lead to fines and jail terms.
- In 2002, a supplementary list of voters was created in which Ahmadiyyas were categorized as non-muslins.
- Even following amendments in the constitution, Ahmadiyyas are the only religious group in Pakistan to continue being on a separate electoral list.
- As per section 298-C, "Any person of the Qadiani Group or the Lahori Group (who call themselves 'Ahmedis' or by any other name), who directly or indirectly, poses as a Muslim, or calls, or refers to, his faith as Islam, or preaches or propagates is faith or invites others to accept his faith by words, either spoken or written, or by visible representations, or in any manner whatsoever outrages the religious feelings of Muslims shall be punished with imprisonment of either description for a term which may extend to three years and shall also be liable to fine.

5. Ahmadiyya Movement

- The Ahmadiyya forms a sect of Islam that originated in India. It was founded by Mirza Ghulam Ahmad in 1889.
- It was based on liberal principles. It described itself as the standard-bearer of the Mohammedan Renaissance, and based itself, like the Brahmo Samaj, on the principles of the universal religion of all humanity, opposing jihad (sacred war against non-Muslims).

- The movement spread Western liberal education among Indian Muslims.
- The Ahmadiyya community is the only Islamic sect to believe that the Messiah had come in the person of Mirza Ghulam Ahmad to end religious wars and bloodshed and to reinstate morality, peace, and justice.
- They believed in separating the mosque from the State as well as in human rights and tolerance.
- However, the Ahmadiyya Movement, like Bahaism which flourished in West Asian countries, suffered from mysticism.

GS I: World geography

AFTERSHOCKS

1. Context

According to data from the U.S. Geological Survey (USGS), over 30 earthquakes over a magnitude of 4 have been recorded in Turkey since the original quake, with the strongest being a quake measured at 7.5 Mv at 13:24 local time (GMT +3)

2. What is Aftershocks and Foreshocks

According to U.S Geological Survey (USGS)

Aftershocks are a sequence of earthquakes that happen after a larger mainshock on a fault

Aftershocks occur near the fault zone where the mainshock rupture occurred and are part of the "readjustment process" after the main slip on the fault

While they become less frequent with time, they can continue for days, weeks, months, or even years for a very large mainshock

The frequency of these aftershocks decreases with time

Historically, deep earthquakes (>30 km) are much less likely to be followed by aftershocks than shallow earthquakes

Foreshocks are earthquakes that precede larger earthquakes in the same location. An earthquake cannot be identified as a foreshock until after a larger earthquake in the same area occurs

3.Effect of Aftershocks

- Although aftershocks tend to be weaker than the main seismic event, they can cause significant damage
- In Turkey, reports suggest that significant damage that has followed the original quake has been a result of aftershocks
- With the main earthquake already weakening structures, aftershocks have sent many buildings tumbling
- The massive 7.5 magnitude aftershock in Turkey can actually be more devastating, say experts
- This aftershock was extremely shallow, only 10 km deep, which worsens the shaking felt
- The main quake was 17.9 km deep. Shallower quakes are generally felt more intense than deeper quakes due to their proximity to the surface
- According to the ShakeMap, which calculates the intensity of quakes, this earthquake has been classified to have an intensity of VIII, indicating severe shaking and moderate to heavy damage
- The original quake reported an intensity of IX
- Crucially, aftershocks throw a spanner in ongoing relief and rescue operations, often hurting rescuers themselves

4.Significance of depth

- Earthquakes occur in the crust or upper mantle, which ranges from the earth's surface to about 800 kilometers deep (about 500 miles)
- The strength of shaking from an earthquake diminishes with increasing distance from the earthquake's source, so the strength of shaking at the surface from an earthquake that occurs at 500 km deep is considerably less than if the same earthquake had occurred at 20 km depth
- Also, the depths of earthquakes gives us important information about the Earth's structure and the tectonic setting where the earthquakes are occurring

- The most prominent example of this is in subduction zones, where plates are colliding and one plate is being subducted beneath another
- By carefully plotting the location and depth of earthquakes associated with a subduction zone, we can see details of the zone's structure, such as how steeply it is dipping, and if the down-going plate is planar or is bending
- These details are important because they give us insight into the mechanics and characteristics of the deformation in the subduction zone
- The deepest earthquakes occur within the core of subducting slabs - oceanic plates that descend into the Earth's mantle from convergent plate boundaries, where a dense oceanic plate collides with a less dense continental plate and the former sinks beneath the latter
- The plate boundary contact between two such plates generate very large, shallow subduction zone earthquakes such as the Sumatra 2004 M9.1 event, and the 2011 M9.0 Japan earthquake, and is only active to relatively shallow depths - approximately 60 km
- However, because oceanic slabs are relatively cold with respect to the surrounding mantle in deeper subduction zone environments, faults within the core of these slab remain brittle and can generate earthquakes to depths of as much as 700 km (e.g., Pacific Plate beneath Japan and Kamchatka, and beneath Tonga)
- As the slab descends into the mantle, rheology changes (viscosity characteristics) cause the plate to bend and deform, and generates these earthquakes. The trend of such events can be seen in cross-sections of subduction zones, and are known as "Wadati-Benioff Zones"

GS I: World Geography

NORTH STAR

1. Context

Vice President Jagdeep Dhankhar on Friday said Parliament is the “North Star” of democracy, “a place of discussion and deliberation to realize the aspirations and dreams of the people”. Last month, Chief Justice of India D Y Chandrachud described the basic structure of the Constitution, laid down by the Supreme Court

in the 1973 Kesavananda Bharati judgment, as the "North Star" that "guides and gives a certain direction to the interpreters and implementers of the Constitution when the path ahead is convoluted".

2. North Star

- Polaris, known as the North Star or Pole Star, is a very bright star around 2,500 times more luminous than the Sun. It is a part of the constellation Ursa Minor and is around 323 light years away from the earth.
- Since Polaris is less than 1 degree away from the north celestial pole, almost in direct line with the Earth's rotational axis, it appears to sit motionless in the northern sky, with all the other stars appearing to rotate around it.
- Its position and brightness have allowed humans to use it for navigation since late antiquity. Simply the elevation of the star above the horizon gives the approximate latitude of the observer.
- In the northern hemisphere, if you can spot Polaris, you can tell the north and by extension, the other three directions as well.
- However, upon crossing the equator to the south, the North star is lost over the horizon and hence stops being a useful navigational aid.

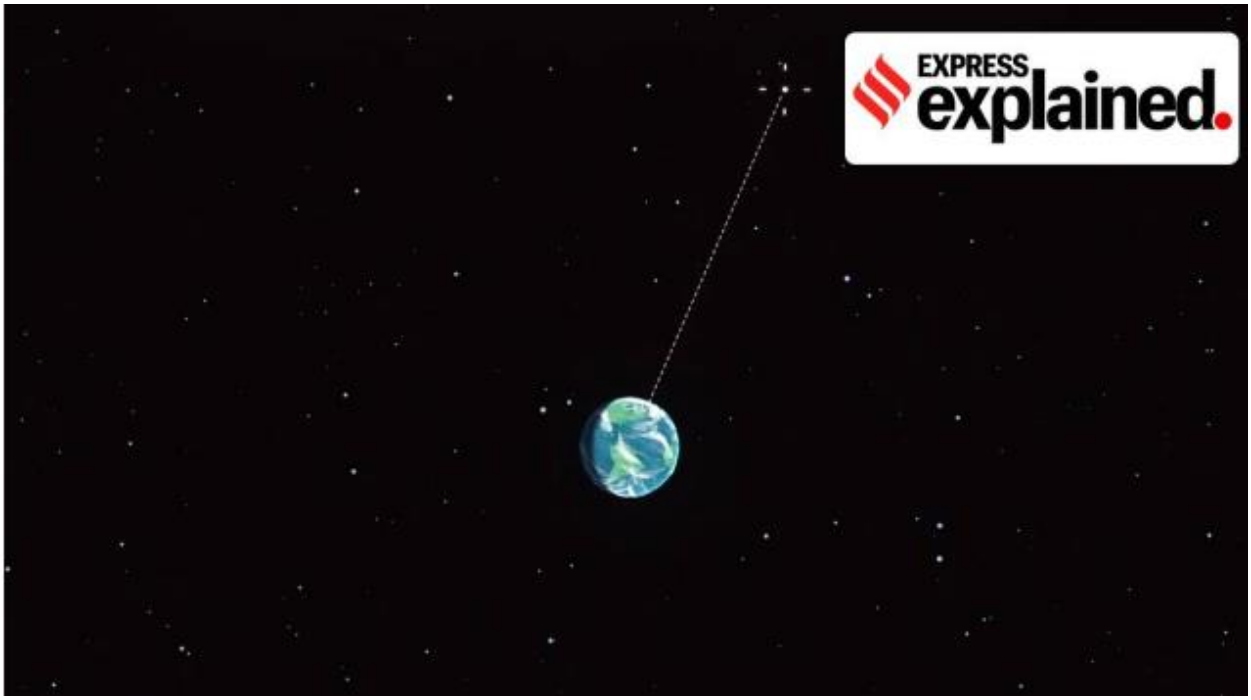

Image source: The Indian Express

3. Where is North star Located?

- When the earth rotates about its axis, the pole star 'appears' to remain stationary because the position of the earth remains unchanged with respect to the pole star. Pole stars are also known as Polaris or North Star.
- So no matter wherever we are residing on the earth and the time, the position of the pole star remains on this axis.
- However, this is not the case with the other stars in the galaxy. Only, the pole star is visible from the northern hemisphere.
- The pole star will not last forever. The earth's axis has been rotating slightly for the last thousand years. This is called 'Precession', resulting in the pole star shifting from the axis.
- A time will come, the present pole star will vanish and some other star, which is lying on the axis of the earth at that time will become our new pole star.

4. Ptolemy and Columbus

- Polaris seems to have been first charted by the Roman mathematician and astronomer Ptolemy, who lived from about 85 to 165 BC.
- While there is some evidence that the star was used for navigation in late antiquity, it became a central part of human history during the ‘Age of Exploration’.
- Christopher Columbus, on his first trans-Atlantic voyage of 1492, “had to correct (his ship’s bearings) for the circle described by the pole star about the pole”, and the star became an invaluable aid to the European colonists seeking out far-off lands across the seas.

5. Literary Metaphor

- The first well-known instance of the North star appearing in literature outside of a technical treatise on astronomy or a biography of an explorer is in Shakespeare's Julius Caesar, where the eponymous emperor describes himself as being "as constant as the Northern Star".
- However, the "constant" North star was probably not known to the real Caesar (reign 49-44 BC). Also, as the NASA page on Polaris points out, "North Star" is " a title that passes to different stars over time".

- As the Earth's axis of rotation wobbles in the same way as a spinning top, the celestial pole " wanders in a slow circle over the eons, sweeping past different stars.
- About 14,000 years ago, the celestial pole pointed toward the bright star Vega, and it will again point to Vega in about 12,000 years.

GS I: World Geography

EARTHQUAKE

1. Context

More than 1,500 people died and several hundred were injured after a major earthquake of magnitude 7.8 hit south-central Turkey and Northwest Syria on Monday early morning. Turkey's President Tayyip Erdoğan said that authorities are yet to determine how high the death toll might rise as search and rescue operations are still going on.

2. What is an Earthquake?

An earthquake is an intense shaking of the ground caused by movement under the earth's surface. It happens when two blocks of the earth suddenly slip past one another, according to USGS. This releases stored-up 'elastic strain' energy in the form of seismic waves, which spreads through the earth and cause the shaking of the ground.

3. How do exactly Earthquakes Occur?

- As we know, the earth's outermost surface, crust, is fragmented into tectonic plates. The edges of the plates are called plate boundaries, which are made up of faults.

The tectonic plates constantly move at a slow pace, sliding past one another and bumping into each other.

- As the edges of the plates are quite rough, they get stuck with one another while the rest of the plate keeps moving.
- Earthquake occurs when the plate has moved far enough and the edges unstick on one of the faults.
- The location below the earth's surface where the earthquake starts is called the hypocenter, and the location directly above it on the surface of the earth is called the epicenter."

4. Earthquake waves

The release of energy during an earthquake generates waves which are called Earthquake Waves. Earthquake waves are basically of two types body waves and surface waves.

Body waves: They are generated due to the release of energy at the focus and move in all directions traveling through the body of the earth. Hence, the name body waves. The body waves interact with the surface rocks and generate a new set of waves called surface waves.

Surface waves: These waves move along the surface. The velocity of waves changes as they travel through materials with different densities. The denser the material, the higher the velocity. Their direction also changes as they reflect or refract when coming across materials with different densities.

There are two types of body waves. They are called P and S-waves.

P-waves or 'primary waves' move faster and are the first to arrive at the surface. The P-waves are similar to sound waves. They travel through gaseous, liquid, and solid materials.

P-waves vibrate parallel to the direction of the wave. This exerts pressure on the material in the direction of propagation. As a result, it creates density differences in the material leading to stretching and squeezing of the material.

S-waves or secondary waves arrive at the surface with some time lag. They can travel only through solid materials. This characteristic of the S-waves is quite important. It has helped scientists to understand the structure of the interior of the earth.

The direction of vibrations of S-waves is Perpendicular to the wave direction in the vertical plane. Hence, they create troughs and crests in the material through which they pass. Surface waves are considered to be the most damaging waves.

5. Measuring of Earthquakes

- The earthquake events are scaled either according to the magnitude or intensity of the shock.
- The magnitude scale is known as the Richter scale. The magnitude indicates the energy released during the quake. It is expressed in absolute numbers 0-10.
- The intensity scale is named after Mercalli, an Italian seismologist. The intensity scale indicates the visible damage caused by the event. The range of intensity scale is from 1-12.

6. Turkey and Syria lie in a seismically active region

- The region where the earthquake struck lies along a well-known seismic fault line called the Anatolia tectonic block that runs through northern, central, and eastern Turkey.
- It is a seismically active zone-though not as active as, say, the Himalayan region which is one of the most dangerous regions in the world from the perspective of earthquakes.
- Large earthquakes, of magnitude 5 or higher, have not been very frequent in recent years. According to USGS, only three earthquakes of magnitude 6 or more have happened in the region since 1970. The last major quake in this area came in January 2020.
- The seismicity in this region is a result of interactions between the African, Eurasian, and Arabian plates. The Arabian plate is known to be pushing northward, which results in a slight westward movement for the Anatolian plate, where Turkey is located.
- The earthquake happened around the near-vertical fault line on the eastern Anatolian block, close to the Syrian border.

7. Shallow Earthquakes cause much greater damage

- Earthquakes in Turkey emerged from relatively shallow depths which made them devastating. The first earthquake, of magnitude 7.8, originated 17.9 km below the earth's surface.
- All the subsequent ones, including one of 7.5 magnitudes, emerged from even closer to the surface.
- Shallow earthquakes are generally more devastating because they carry greater energy when they emerge on the surface.
- Deeper earthquakes lose much of their energy by the time they come to the surface. The deeper quakes spread farther though- the seismic waves move conically upwards to the surface even as they lose energy while traveling greater distances and hence cause less damage.

8. Can earthquakes be predicted?

- An accurate prediction of an earthquake requires some sort of a precursory signal from within the earth that indicates a big quake is on the way.
- Moreover, the signal must occur only before large earthquakes so that it doesn't indicate every small movement within the earth's surface. Currently, there is no equipment to find such precursors, even if they exist.
- Theoretically, it is possible to offer a lead time of a few seconds between the time of the origin of the earthquake and the time it reaches the Earth's surface.
- Seismic waves travel significantly slower than the speed of light between 5 and 13 km
  per second. So if the earthquake is detected as soon as it is triggered, information about it can be related a few seconds ahead of it reaching the ground.
- Such systems are already in use in some locations to issue alerts about earthquakes. However, these are not predictions. The alerts are issued post-event.
- Attempts to find reliable predictors of earthquakes have not been fruitful so far. Scientists have been able to map the areas that are earthquake-prone, and are likely to generate earthquakes in the future, but there is no way to predict when.

GS II: International relations

GREEN DEAL INDUSTRIAL PLAN

1. Context

In a bid to support and expand its green industry, the European Union on February 1 revealed the **"Green Deal Industrial Plan"** which aims to cut red tape and provide massive subsidies.

2. Key Points

- The move has come just a few months after the United States announced its Inflation Reduction Act (IRA), which contains billions of dollars of tax cuts for clean energy and climate change programs with incentives for US-based manufacturing.
- The plan will be debated by EU leaders at a summit next week. The National Governments must approve the initiative for its implementation.

3. About the Green Deal Industrial Plan

It is the proposal involves building a simpler regulatory framework, providing faster access to funds, enhancing skills and improving the EU's trade network.

3.1. Simpler regulatory framework

- The plan seeks to formulate a "**Net-Zero Industry Act**", which will not only simplify rules but also speed up the issuance of permits for green projects, such as renewable energy generation arrays, carbon capture and renewable hydrogen production facilities.
- It also includes a "**Critical Raw Materials Act**", which will provide access to materials like rare earth that are crucial for developing net-zero technology.

3.2. Providing faster access to funds

- According to the proposal, state aid rules will be loosened to help the EU's 27 governments with investing in clean energy projects.
- Keeping in mind that every country does not have deep pockets like France and Germany to provide subsidies to companies, the plan allows countries to take money from existing EU funds.
- Notably, the proposal does not involve any fresh crashes and seeks to direct €250 billion to serve the green industry from the existing EU Money, which is around €800 billion.
- There is also a provision for setting up a "**European Sovereignty Fund**" in the future to "give a structural answer to the investment needs".

3.3. Enhancing Skills

- The plan aims to establish "**Net-Zero Industry Academies**" that will provide up-skilling and re-skilling programmes in strategic industries.
- 30 to 40 per cent of the existing jobs might get affected due to the green transition.
- Therefore, the "**Green Deal Industrial Plan**" focuses on developing the skills needed for well-paid quality jobs.

3.4. Improving the trade network

- The plan underlines the importance of open trade and seeks to further "**Develop the EU's network of Free Trade Agreements and other forms of cooperation with partners to support the green transition**".
- The European Commission wants to establish trade deals for raw materials and clean tech with "**like-minded partners**".

4. Counter to the USA's Inflation Reduction Act (IRA)

- In August 2022, President Joe Biden's administration unveiled its climate change legislation, which will direct $390 billion towards clean energy projects.
- The IRA provides huge tax breaks and incentives to both customers and manufacturers.
- However, soon after the legislature was revealed, leaders of the European Union expressed concerns regarding its possibly "**discriminatory**" provisions.

5. EU member's Claims

- The EU members have claimed that IRA's tax credits and subsidies to green product makers would put European companies at a disadvantage and might lure them to the United States.
- In November 2022, the IRA contains clear discriminatory elements, which would hurt EU companies and their possibilities to export to the US, as well as our capacity to compete fairly with U.S. products on third-country markets.
- It did not come as a surprise when the bloc announced to come up with its plan of providing subsidies to sustainable companies.
- Although analysts have praised the EU for recognising the need to act on Europe's "**Worsening**" competitiveness, a section of them fear that the IRA and the new "Green Deal Industrial Plan" might trigger a global subsidy war.
- Some economists and policymakers warn that wide-ranging government support such as that contained in the act isn't always effective and does not necessarily create the strong industries it is supposed to. Projects might not get built and companies could end up failing, wasting money.

GS II: International relations

PARIS CLUB

1. Context

The Paris Club, an informal group of creditor nations, will provide financial assurances to the International Monetary Fund on Sri Lanka’s debt, Reuters has reported quoting two unnamed sources. An assurance from the Paris Club, as well as other bilateral creditors, is one of the conditions that Sri Lanka has to fulfill for the IMF to begin disbursing a $2.9 bn bailout package to the beleaguered nation that all but collapsed last year under a severe economic crisis.

2. About Paris Club

- The Paris Club is a group of mostly western creditor countries that grew from a 1956 meeting in which Argentina agreed to meet its public creditors in Paris.
- Their objective is to find sustainable debt-relief solutions for countries that are unable to repay their bilateral loans.
- It describes itself as a forum where official creditors meet to solve payment difficulties faced by debtor countries.
- All 22 are members of the group called Organization for Economic Co-operation and Development (OECD).
- Other creditor nations are allowed to participate in negotiation meetings on a case-by-case basis if they meet certain conditions.
- The members meet in Paris once a month except for February and August.
- Each meeting includes a one-day 'Tour horizon, during which creditors talk about the external debt situation of debtor nations or issues regarding how those countries are managing their debts.
- The Paris Club invites debtor nations to a meeting with its creditors after it has concluded an appropriate program with the IMF (International Monetary Fund) that shows that the country cannot meet its external debt obligations, and therefore requires a new payment arrangement with its foreign creditors.
- Representatives of the World Bank, the IMF, and other international institutions, plus the relevant regional development bank, may also attend the meeting as observers.
- The debtor country's representative is usually its Minister of Finance, who heads a team comprising officials from his or her ministry and the central bank.
- The members are Australia, Belgium, Canada, Denmark, Finland, France, Germany, Ireland, Israel, Japan, Netherlands, Norway, Russia, South Korea, Spain, Sweden, Switzerland, the United Kingdom, and the United States.

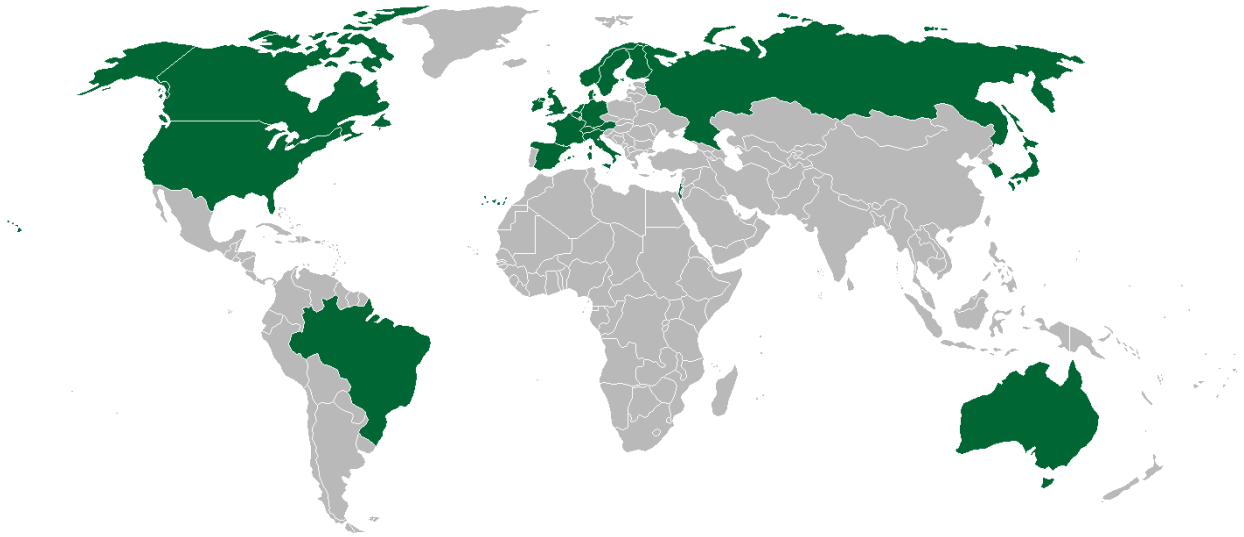

Image Source: Wikimedia

3. How has Paris Club been involved in debt agreements?

- According to the information on its website, since its beginning, the Paris Club has reached 478 agreements with 102 different debtors countries. Since 1956, the debt treated in the framework of the Paris Club agreement amounts to $ 614 billion.
- It operated on the principles of consensus and solidarity. Any agreement reached with the debtor country will apply equally to all its Paris Club creditors.
- A debtor country that signs an agreement with its Paris Club creditors, should not then accept from its non-Paris Club commercial and bilateral creditors such terms of treatment of its debt that are less favorable to the debtor than those agreed with the Paris Club.
- The Paris group countries dominated bilateral lending in the last century, but their importance has reduced over the last two decades or so with the emergence of China as the world's biggest bilateral lender.
- In Sri Lanka's case, for instance, China, Japan, and India are the largest bilateral creditors. Sri Lanka's debt to China is 52 percent of its bilateral debt, 19.5 percent to Japan, and 12 percent to India. With Japan a member of the Paris Club, Sri Lanka needed assurances from China and India as well.

4.How has the Paris Club role over a time

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- In Sri Lanka's case, for instance, China, Japan and India are the largest bilateral creditors
- Sri Lanka's debt to China is 52 per cent of its bilateral debt, 19.5 per cent to Japan, and 12 per cent to India
- With Japan, a member of the Paris Club, Sri Lanka needed assurances from China and India as well
- The Paris Club had tried to get both countries on board a centralised effort, but Delhi launched its own bilateral negotiations with Colombo
- The reported readiness by the Paris Club comes against this background. That still leaves China, whose Exim Bank offered a two-year moratorium on its loans soon after the Indian announcement

GS II: International relations

MICRONESIA

1. Context

The Federated States of Micronesia, a small island country in the Pacific that is home to around 1, 10, 000 people, is one of the latest places on Earth to experience an outbreak of Covid-19, after two and a half years of successfully protecting itself from the virus.

2. Key points

- Government officials announced on July 19 that they had detected several new cases in two of the country's four states.
- Thirty-five people tested positive for the virus in Kosrae and another seven cases were found in the state of Pohnpei.
- Micronesia had earlier planned to lift its quarantine restrictions and open its borders on August 1.

3. Micronesia's geography

- Located in the Western Pacific, in the Micronesia sub-region of **Oceania**, the Federated States of Micronesia (FSM) consists of four island states, **Yap, Chuuk, Kosrae and Pohnpei** (Where the capital Palikir is located) are all in the **Caroline Islands**.
- Also known as the Carolines, it is a scattered **archipelago** of small islands that are divided between Micronesia and the **Republic of Palau**.

FSM is composed of 607 islands and islets with a total land area of 702 square km. while this area is rather small, the islands stretch across an estimated 2, 900 sq km of sea, giving the nation the 14th largest Exclusive Economic Zone (EEZ) in the world.
EEZs grant countries special rights over marine resources up to 370 km from their coasts.

- The Federated States of Micronesia shares its sea borders with other small island nations and territories in the Micronesia region like **Guam, the Republic of the Marshall Islands, Palau, Kiribati and the Mariana Islands.**
- Its larger neighbouring states are separated by large swathes of the Pacific Ocean including the **Philippines in the west, Hawaii in the east, Papua New Guinea and Australia to the south and Japan to the north.**

Image Source: World Atlas.com

4. Micronesia in the pandemic

- FSM reported its first case in January 2021, when a crew member isolated on a ship near Pohnpei tested positive.
- But the country was thereafter successful in protecting itself from the pandemic until very recently which was in part due to its geographical isolation and the absence of land borders with other countries.
- In August 2021, the country introduced a rule requiring all eligible citizens to get vaccinated against Covid.
- Only vaccinated citizens could receive federal funds such as pandemic stimulus payments and security benefits.
- FSM also imposed strict border controls, suspended international travel and issued quarantine orders for citizens.
- These measures were deemed essential given the limited medical infrastructure of the islands and issues of logistics given the topography.

While health services in hospitals, dispensaries and community health centres are highly subsidised by the government, as of 2017 there were only six private health clinics and one private hospital in the country.
The WHO noted that it is difficult for residents of the outer islands to access hospitals.

- Other small, isolated countries in the **Pacific such as Kiribati, Tonga and Samoa** have reported coronavirus outbreaks at various times during the global pandemic.
- An AFP report from July 19 said the **Marshall Islands and Tuvalu** are the last two countries in the region to remain Covid-free still.

GS II: Governance

PRIMARY AGRICULTURAL CREDIT SOCIETIES (PACS)

1. Context

The Union Budget has announced Rs 2,516 crores for the computerisation of 63, 000 Primary Agricultural Credit Societies (PACS) over the next five years, to bring greater transparency and accountability in their operations and enable them to diversify their business and undertake more activities.

2. About PACS

- PACS are village-level cooperative credit societies that serve as the last link in a three-tier cooperative credit structure headed by the State Cooperative Banks (SCB) at the state level.
- Credit from the SCBs is transferred to the district central cooperative banks or DCCBs, that operate at the district level.
- The DCCBs work with PACS, which deals directly with farmers.
- Since these are cooperative bodies, individual farmers are members of the PACS and office-bearers are elected from within them. A village can have multiple PACS.

- PACS are involved in short-term lending or what is known as crop loans.
- At the start of the cropping cycle, farmers avail credit to finance their requirement of seeds, fertilisers etc.
- Banks extend this credit at 7 per cent interest, of which 3 per cent is subsidised by the Centre and 2 per cent by the state government.
- Effectively, farmers avail the crop loans at 2 per cent interest only.

3. RBI report

- A report published by the Reserve Bank of India on December 27, 2022, put the number of PACS at 1.02 lakh. At the end of March 2021, only 47, 297 of them were in profit.
- The same report said PACS had reported lending worth Rs 1,43, 044 crores and NPAs of Rs 72, 550 crores.
- Maharashtra has 20, 897 PACS of which 11, 326 are in losses.

4. Reasons for the attraction of PACS

- The attraction of the PACS lies in the last-mile connectivity they offer.
- For farmers, timely access to capital is necessary at the start of their agricultural activities.
- PACS can extend credit with minimal paperwork within a short time.
- With other scheduled commercial banks, farmers have often complained of tedious paperwork and red tape.
- For farmers, PACS provide strength in numbers, as most of the paperwork is taken care of by the office-bearer of the PACS.
- In the case of scheduled commercial banks, farmers have to individually meet the requirement and often have to take the help of agents to get their loans sanctioned.

5. NABARD's annual report

- NABARD's annual report for 2021-22 shows that 59.6 per cent of the loans were extended to small and marginal farmers.
- Since PACS are cooperative bodies, however, political compulsions often trump financial discipline and the recovery of loans is hit.
- Chairpersons of PACS participate in electing the office-bearers of DCCBs.
- Political affiliations are important here as well.

6. Computerisation

- The SCBs and DCCBs are connected to the Core Banking Software (CBS), PACS are not.
- Some PACS use their software, but a compatible platform is necessary to bring about uniformity in the system.
- The computerisation of PACS has already been taken up by a few states, including Maharashtra.
- The Maharashtra State Cooperative Bank has plans to directly lend to PACS in districts where the DCCBs are either financially weak or have lost their banking licence.
- In such scenario computerisation of PACS would help.

GS II: Polity

JOINT PARLIAMENTARY COMMITTEE

1. Context

The Opposition on February 2 joined hands to demand a probe either by a Joint Parliamentary Committee (JPC), headed by the Supreme Court or monitored by the Chief Justice of India, into the allegations of fraud and stock manipulation against the Adani Group.

2. Key Points

- A meeting called by the Congress ahead of the day's proceedings in the Parliament saw participation by 13 other parties, including those that have been known to stay away from Congress-led initiatives, such as the Trinamool Congress (TMC), the Aam Aadmi Party (AAP) and the Bharat Rashtra Samithi (BRS).
- Before this, the Opposition had sought JPC probes into the Rafale deal and demonetisation, but the demand was not granted.
- Ever since the BJP came to power in 2014, no JPC has been set up.

3. About Joint Parliamentary Committee

- A Joint Parliamentary Committee (JPC) is set up by the Parliament for a special purpose, like the detailed scrutiny of a subject or Bill.
- It has members from both the Houses and from both the ruling parties and the opposition.
- It is dissolved after its term ends or its task has been completed.

3.1. Set up of JPC

- A JPC is set up after one House of Parliament has passed a motion and the other has agreed to it.
- Members of the JPC are decided by the Parliament.
- The number of members can vary there is no fixed number.

3.2. Functions of JPC

- The mandate of a JPC depends on the motion constituting it.
- For example, The terms of reference for the JPC on the stock market scam asked the committee to look into financial irregularities, to fix responsibility on persons and institutions for the scam, to identify regulatory loopholes and also to make suitable recommendations.

To fulfil its mandate, a JPC can scrutinise documents and summon people for questioning.
It then submits a report and makes recommendations to the government.

3.3. Powers of JPC

- **While the recommendations of a JPC have persuasive value, they are not binding on the government.**
- The government can choose to launch further investigations based on what the JPC has said, but it can't be forced to do so.
- The government is required to report on the follow-up action taken based on the recommendations of the JPC and other committees.
- The Committees then submit "**Action Taken Reports**" in parliament based on the government's reply.

3.4. JPCs set up so far

There have been six JPCs set up so far. These are

1. JPC to examine matters relating to the Allocation and Pricing of Telecom Licenses and Spectrum
2. JPC on Pesticide Residues in and Safety Standards for Soft Drinks, Fruit Juice and other Beverages
3. JPC on Stock Market Scam and Matters Relating thereto
4. JPC to enquire into irregularities in Securities and Banking Transactions
5. JPC to enquire into Bofors Contract
6. Joint Committee to Examine the Constitutional and Legal Position Relating to Office of Profit.

GS II: Polity

ARTICLE 105

1. Context

In his letter to Rajya Sabha Chairman Jagdeep Dhankhar on February 9, Kharge cited Article 105 of the Constitution which deals with the privileges and powers of parliamentarians.
Protesting against the expunction of parts of his speech on the motion of thanks on the President's address, Leader of Opposition in Rajya Sabha and Congress president Mallikarjun Kharge has argued that MPs have freedom of speech and that he did not make any personal allegations in the House.

2. About Article 105

Article 105 of the Constitution deals with "powers, privileges, etc of the Houses of Parliament and the members and committees thereof and has four clauses.
1. Subject to the provisions of this Constitution and the rules and standing orders regulating the procedure of Parliament, there shall be freedom of speech in Parliament.

2. No member of Parliament shall be liable to any proceedings in any court in respect of anything said or any vote was given by him in Parliament or any committee thereof and no person shall be so liable in respect of the publication by or under the authority of either House of Parliament of any report, paper, vote or proceedings.
3. In other respects, the powers, privileges and immunities of each House of Parliament and of the members and the committees of each House shall be such as may from time to time be defined by Parliament by law and until so defined shall be those of that House and its members and committees immediately before the coming into force of section 15 of the Constitution (Forty-fourth Amendment) Act, 1978.
4. The provisions of clauses 1, 2 and 3 shall apply to persons who by the virtue of this Constitution have the right to speak in and otherwise to take part in the proceedings of, a House of Parliament or any committee thereof as they apply about members of Parliament.

- Simply put, Members of Parliament are exempted from any legal action for any statement made or act done in the course of their duties.
- For example, a defamation suit cannot be filed for a statement made in the House.
- This immunity extends to certain non-members as well, such as the Attorney General for India or a Minister who may not be a member but speaks in the House.
- In cases where a Member oversteps or exceeds the contours of admissible free speech, the Speaker or the House itself will deal with it, as opposed to the Court.

3. Restrictions on this privilege

There are some restrictions on this privilege, indeed. For example, Article 121 of the Constitution prohibits any discussion in Parliament regarding the "Conduct of any Judge of the Supreme Court or of a High Court in the discharge of his duties except upon a motion for presenting an address to the President praying for the removal of the Judge.

4. The origin of the Privilege of Parliament

- The Government of India Act, of 1935 first brought this provision to India, with references to the powers and privileges enjoyed by the House of Commons in Britain.
- An initial draft of the Constitution too contained a reference to the House of Commons, but it was subsequently dropped.
- However, unlike India where the Constitution is paramount, Britain follows Parliamentary supremacy.
- The privileges of the House of Commons are based on Common law, developed over centuries through precedents.

4.1. R vs Elliot, Holles and Valentine

- In the 17th Century case "**R vs Elliot, Holles and Valentine**", Sir John Elliot, a member of the House of Commons was arrested for seditious words spoken in a debate and for violence against the speaker.
- However, the House of Lords provided immunity to Sir John, saying that words spoken in Parliament Should only be judged therein.
- This privilege has also been enshrined in the Bill of Rights 1689, by which the Parliament of England definitively established the principle of a constitutional monarchy.

4.2. Bradlaugh v. Gosset

In the 1884 case of "**Bradlaugh v. Gosset**", then the Chief Justice Lord Coleridge of the House of Lords observed: What is said or done within the walls of Parliament cannot be inquired into in a court of law".

5. Indian courts rulings

5.1. Tej Kiran Jain v N Sanjiva Reddy

- In the 1970 ruling in "**Tej Kiran Jain v N Sanjiva Reddy**", the Supreme Court dismissed a plea for damages filed by the followers of the Puri Shankaracharya against parliamentarians.
- The judgement recalled that in March 1969, a World Hindu Religious Conference was held at Patna.
- The Shankaracharya took part in it and is reported to have observed that untouchability was in harmony with the tenets of Hinduism and that no law

could stand in its way and to have walked out when the National Anthem was played.

- The petitioners claimed that when the issue was debated in Parliament, uncharitable remarks were made against the seer.
- The petitioners argued that the MP's immunity was against an alleged irregularity of procedure but not against illegality.
- However, the SC ruled that "the word "**anything**" in Article 105 is of the widest import and is equivalent to '**everything**' ".

5.2. P V Narasimha Rao vs. The state's

- Almost two decades later, in 1998, the SC in the case of P V Narasimha Rao vs. The state's answered two questions on parliamentary privilege, broadly relating to questions of corruption.
- In 1993, Narasimha Rao was the Prime Minister of a minority government at the Centre.
- When a vote of no-confidence was called by members of the opposition against the government, some factions of the ruling party paid Jharkhand Mukti Morcha (JMM) members to vote against the motion.
- The motion was defeated in the House, with 251 members supporting it and 265 members against it.

Two questions came before the Supreme Court.
1. Whether MPs could claim immunity from prosecution before a criminal court on charges of bribery related to parliamentary proceedings, under Articles 105 (1) and 105 (2).
2. Whether an MP is a "Public Servant" under the Prevention of Corruption Act, 1988.

- A five-judge Bench of the apex court ruled that the ordinary law would not apply to the acceptance of a bribe by an MP in case of parliamentary proceedings.
- Broadly interpreted, as we think it should be, Article 105 (2) protects a Member of Parliament against proceedings in court that related to or concern, or have a connection or nexus with anything said, or a vote given, by him in Parliament.

- The court said, giving a wider ambit to the protection accorded under Article 105 (2).
- The Court rationalised this by saying it will "enable members to participate fearlessly in Parliamentary debates" and that these members need wider protection of immunity against all civil and criminal proceedings that bear a nexus to their speech or vote.

GS II: Polity

ARTICLE 356

1. Context

On Thursday (February 9), Prime Minister Narendra Modi recalled in Rajya Sabha that congress governments at the Centre had dismissed 90 state governments by "misusing" Article 356 of the constitution and that former PM Indira Gandhi had "misused" it 50 times to dismiss elected state governments.

2. Article 356

- Article 356 of the Constitution of India gives the President of India power to suspend state government and impose President's rule of any state in the country "if he is satisfied that a situation has arisen in which the government of the state cannot be carried on by the provisions of the Constitution.
- It is also known as a "State Emergency" or "Constitutional Emergency".
- Upon the imposition of this rule, there would be no council of Ministers.
- The state will fall under the direct control of the Union government, and the Governor will continue to head the proceedings, representing the President of India.

3. Parliamentary approval and Duration

- A proclamation imposing President's Rule must be approved by both the House of Parliament within two months from the date of its issue.

- The approval takes place through a simple majority in either House, that is, a majority of the members of the House present and voting.
- Initially valid for six months, the President's Rule can be extended for a maximum period of three years with the approval of the Parliament, every six months.

4. Report of the Governor

- Under Article 356, President's Rule is imposed if the President, upon receipt of the report from the Governor of the state or otherwise, is satisfied that a situation has arisen in which the government of the state cannot be carried on by the provisions of the Constitution.
- A proclamation of the President's Rule may be revoked by the President at any time by a subsequent proclamation. Such a proclamation does not require parliamentary approval.

5. Origins of Article 356

- Article 356 was inspired by section 93 of the Government of India Act, of 1935. This provided that if a Governor of a province was satisfied that a situation had arisen in which the government of the province cannot be carried on by the provisions of the said Act, he could assume to himself all or any of the powers of the government and discharge those functions in his discretion.
- The Governor, could not encroach upon the powers of the high court. For the British, this provision allowed for a 'controlled democracy'-while providing some autonomy to provincial governments, section 93 allowed the British authorities to exercise ultimate power when they deemed necessary.

6. How was the provision used as a political weapon in independent India?

- During the decades of Congress's dominance at the Centre, Article 356 was used against governments of the Left and regional parties in the states.
- Until 1959, Jawaharlal Nehru's government had used the article six times, including to dislodge the first-ever elected communist government in the world, in Kerela in 1959.
- In the 1960s, it was used 11 times. After Indira came to power in 1966, Article 356 was used seven times between 1967 and 1969 alone.

- The 1970s were more politically turbulent. Between 1970 and 1974, President's Rule was imposed 19 times.
- Post Emergency, the Janata party government used it in 1977 to summarily dismiss nine congress-state governments. When Indira returned to power in 1980, her government too imposed president's Rule in nine states.
- In 1992-93, Prime Minister Narasimha Rao dismissed three BJP governments in the wake of the demolition of Babri Masjid, besides Kalyan Singh's government in UP.

7. Article 356 and its Safeguards

- The 1994 Supreme Court (S.R.Bommai case) majority decision, in essence, overturned a long tradition that the use of Article 356 was not subject to review by courts, a doctrine articulated in a landmark 1997 case, State of Rajasthan Vs Union of India.
- The Bommai case verdict laid down the conditions under which state governments may be dismissed, and the mechanisms for that process.
- In the S.R. Bommai case, a nine-member bench of the supreme court construed the scope of Article 356, which also allows the imposition of the President's Rule in the states, with stringent conditions.
- These included ascertaining whether objective conditions exist which render it impossible to carry out governance in the state where the proclamation has been made and the process has to be approved by both Houses of Parliament before consideration for Judicial review.

GS II: International relations

RUSSIA-CHINA-UKRAINE

1. Context

As the Russia-Ukraine conflict marches toward the one-year mark, there seem to be hardly any signs of de-escalation.

2. Key Points

- Western powers have started providing powerful offensive weapons to Ukraine and Russia has threatened grave consequences in response.
- Moreover, as Western sanctions on Russia progressively tighten, the country is increasingly becoming reliant on China.
- While China has officially been speaking in a largely neutral language, there have been some instances which have come to light recently of China allegedly assisting Russia in its campaign.

3. China's stance on the conflict

- China's formal stance on the conflict has been along the lines of all countries deserve respect for their sovereignty and territorial integrity and that support should be given to all efforts that are conducive to peacefully resolving the crisis which it has consistently been reiterating on the world stage.
- With an emphasis on "**all countries**", China appears to be demonstrating its position as being equidistant from both the conflicting parties.
- However, despite this articulation, China's attitude towards the conflict has often been categorised as "**Pro-Russian neutrality**".
- Russia and China are engaged in a Comprehensive strategic partnership of coordination for a new era and despite the conflict, China has pushed ahead with strengthening its relations with Russia.
- Moreover, China has painted the U.S. and NATO as Prime Instigators of the crisis, echoing the Russian narrative in this regard.

It also needs to be noted that in the past one year since the start of the conflict, out of the seven resolutions put to vote in total at the UN General Assembly, Security Council, Human Rights Council and the World Health Organization by the West against Russia, China voted against three and abstained from four.

- China had only voted in favour of one UN Security Council resolution the proposal which was raised by Russia on humanitarian aid.
- Hence, China's portrayal of a neutral stance has many detractors.
- However, as the conflict progressed, China's rhetoric seems to be becoming less pro-Russia and more neutral in tone.
- Xi Jinping, the President of China, during his November 2022 meeting with German Chancellor Olaf Scholz, warned that the conflict should not cross

the nuclear threshold; perhaps referring to Russia's President Vladimir Putin's nuclear threats to deter Western support to Ukraine.

- Subsequently, in his piece in The National Interest in December 2022, he struck a sympathetic note with the Ukrainians.
- He had also in other instances emphasised that there are some limits in China's relations with Russia despite the talks of a "**no limits**" partnership.
- Apart from the higher level leadership in China, there have also been some alleged noises from below the hierarchy which has been critical of Putin's actions.
- Nevertheless, the new trend in China's attitude to the conflict was once again on display during the G-20 Summit held in Bali in November 2022.
- The leaders' declaration which stated that most members strongly condemned the war did not concur with China only because it objected to calling the conflict a "**war**".
- However, China not opposing the condemnation of the conflict itself, rather than its terminological nuance is something which has not missed international scrutiny.

4. China's involvement in the conflict

- Outside the realm of discourse, China's actions do not seem to carry any such nuances, as it is intervening at least in an indirect manner in the conflict.
- China has benefited immensely from buying cheap Russian oil and gas.
- Since the start of the conflict, China has displaced Germany as the largest purchaser of Russian oil, with Russia replacing Saudi Arabia as China's largest supplier of crude oil.
- The growing collusion between the two countries is not just limited to hydrocarbons, but also extends to materials and technology.
- China's covert assistance to Russia by accessing Russian customs data compiled by C4ADS an American think tank.
- Chinese State-Owned enterprises in the defence sector have provided navigation equipment, jamming technology, radar systems and fighter jet parts to their Russian counterparts.
- According to the data, several tens of thousands of shipments of dual-use goods have been sent by China to Russia, to which the latter would otherwise be having only restricted access due to sanctions.

- It has also been found that millions of chips have made their way to Russia through China; chips are central to modern military equipment and also subject to increasing sanctions by the West both against Russia and China.
- China refuted such allegations and claimed that the military dimensions of such transactions were mere speculations.
- This is in sharp contrast to China's rhetoric which demands Western powers not sends military support to intensify the conflict.

These actions by China have a huge significance concerning recent developments, wherein countries like Germany and the U.S. are sending their offensive weapon platforms to Ukraine such as the **Leopard and Abrams tanks,** respectively.

- The West is starting to take action against China in this milieu. For instance, the U.S. has recently slapped sanctions on Spacety China, a Chinese satellite company which was indirectly providing satellite imagery of Ukraine to the Wagner Group, a Russian private military force which is now heavily involved in the conflict.

5. China's emerging attitude

- While there is a strengthening of neutrality in China's rhetoric, the same is absent in its actions.
- This trend and dichotomy can only be explained by understanding China's larger game plan.
- China needs to keep Russia close and well-supplied because Russia is its premier ally in its large global ambition to undermine U.S. dominance.
- China would also like to keep its Russia card so that in the eventuality of the conflict turning into peace talks, China could use it to gain concessions from the West.
- Perhaps, the ideal bargain that China seeks is on the trade and technology front where it is facing a major challenge from the West of late.
- This is significant for China, especially at a time when it desperately needs a post-Zero Covid economic revitalisation.

China cannot overtly support Russia as it will hurt its relations with both Ukraine and European Union (EU).

China is the largest trading partner for both Russia and Ukraine; in fact, China displaced Russia in 2019 as Ukraine's largest trading partner.

- Ukraine and not the U.S. is China's largest corn supplier and its third largest supplier of military equipment; China is Ukraine's biggest market for defence goods.
- Liaoning, China's first aircraft carrier, is a refurbished aircraft carrier bought from Ukraine after the Soviet Union's disintegration.
- China, therefore cannot abandon all its interests in Ukraine for Russia's sake.
- China also has very strong economic ties with the EU and would like the EU to further bolster its strategic autonomy to act more independently of the U.S. in matters of geopolitics.
- On the whole, China's efforts at the end to encourage Russia in a limited and covert manner, without raising alarms in the West seem to be intended to keep the war going.
- For one, it provides valuable time and information for planning a Taiwan invasion.
- China may be watching and learning from Western assistance to Ukraine to forecast its response to a possible invasion of Taiwan in the future by China.
- It is certainly in China's best interest to keep Russia and the West divided, lest they team up together against China as in the 19th Century.
- Moreover, with the conflict prolonging, the West will be distracted from the Indo-Pacific theatre and Russia will be left weakened to pose any threat to China's growing influence in the post-Soviet space.
- At the same time, China can fill the economic void in Russia left by the withdrawal of Western investment and technology, while engineering an economic recovery for itself.
- China can also build up its strategic reserves and capabilities during the crisis to prepare for an inevitable hostile period of relations with the U.S. in a post-Ukraine scenario.

GS II: International relations

GERMANY-RUSSIA

1. Context

After months of political debate, the German government announced on January 25 that it would send **Leopard 2 main battle tanks** (MBTs) to Ukraine.
The decision marks Germany's shift from its **policy of Ostpolitik** an approach followed to bridge Berlin's division and "**bring change through trade**".

2. The evolution of Germany's policy towards Russia

- Germany's relationship with Russia has always been critical to European security and prosperity.
- Soon after the **Bolshevik revolution** and Germany's defeat in the **First World War**, the Soviet Union and the newly-born German republic signed the **Treaty of Rapallo,** establishing diplomatic relations.
- In August 1939, as war clouds were hovering around Europe, Nazi Germany and the Soviet Union signed a **non-aggression agreement**, which eventually collapsed in 1941 when Hitler invaded the latter.
- After the **Second World War,** Germany was divided between Soviet-backed East Germany and U.S.-backed West Germany.
- Gradually in 1971, with the adoption of "**Ostpolitik**" by West German Chancellor Willy Brandt, significant economic interaction began between the two sides.
- As a result of this policy, Germany signed an agreement and started importing Russian natural gas for the first time.
- It was widely believed that economic interdependence could foster better political ties.

3. During the Post-Cold War Period

- In the Post-Soviet world, a unified Germany doubled down on its efforts to promote ties with Russia.
- The efforts to promote political ties through energy trade continued even as Vladimir Putin and Gerhard Schroder rose to leadership in Russia and Germany, respectively.
- The **Nord Stream I pipeline** transports gas directly from Russia to Germany due to these changing equations.
- The energy relationship went hand-in-hand with the political relationship.

- Regardless of Russia's actions in Georgia (2008) and Crimea (2014), the German political establishment continued enhancing Germany's energy reliance on Russia.

4. Impact of the Ukraine war on Germany's foreign policy

- As Russia invaded Ukraine on February 24, 2022, Germany's policy underwent a fundamental shift.
- Chancellor Scholz declared the war a **Zeitenwende** (turning point) and since then, Germany's policy has moved away from an emphasis on dialogue and diplomacy to a more assertive stance, culminating in the decision to send Leopard 2 MBTs to Ukraine.
- In the initial phases of the war, Berlin believed that a diplomatic solution was possible to bring an end to the conflict.
- However, as the war progressed, Germany amended several of its previous policies that shaped its orientation towards Russia.

5. Germany's response to the Russian-Ukraine war

- One of the key factors driving this policy change is Germany's recognition of the need to reduce its dependence on Russian energy.

Soon after Mr Putin recognised Ukraine's Donetsk and Luhansk provinces as independent republics, Germany stalled the Nord Stream 2 pipeline, which was ready for operation.
Subsequently, it announced the construction of four floating terminals and two permanent onshore sites for enhanced LNG imports, struck an energy deal with Qatar and supported numerous rounds of EU sanctions against Russian entities.

- Germany also worked with other European capitals to ensure swift arms delivery and aid to Ukraine.
- Germany's gradual shift towards a more robust policy towards Russia is a testament to the changing realities of Europe's security landscape.

GS II: International relations

ANATOLIA

1. Context

The Three devastating quakes of 7.8, 7.6 and 6.0 hit Turkey's southern regions on 6th February causing widespread destruction in Turkey and neighbouring Syria.

2. About Anatolia

- Anatolia or Asia Minor Turkish Anadolu, Peninsula forming the western extremity of Asia.
- It is bounded by the **Black Sea to the north, the Mediterranean Sea to the South and the Aegean Sea to the west.**
- Its eastern boundary is generally marked by the Southeastern **Taurus Mountains**.
- Anatolia is roughly contiguous with the Asian portion of the modern Republic of Turkey.
- Because of its location at the point where Asia and Europe meet, it has long been the scene of numerous migrations and conquests.
- It was the original location of the kingdom of Hittites (c 1700-1180 BCE).
- Later, Indo-European peoples, possibly Thracian, established the **Phrygian kingdom**.
- In the 6th century BCE, the Persian Achaemenian dynasty came to rule the area; it was conquered by **Alexander the Great** in 334-333 BCE.
- Beginning in the 1st century BCE, the area was absorbed into the Roman Republic and Empire.
- When the empire split in 395 CE, Anatolia became part of the **Byzantine Empire.**
- The area endured invasions by Arabs, Turks, Crusaders, Mongols and the Turkic army of Timur before the **Ottoman Empire** established full control in the 15th century.
- From 1923 its history was that of modern Turkey.

Image Source: Britanica

3. Prehistoric Cultures of Anatolia

- In most prehistoric periods the regions to the south and west of Anatolia were under the influence of **Syria and the Balkans.**
- The evidence of the earliest cultures of Anatolia may have been lost owing to the large rise in sea levels that followed the end of the last Ice Age and to the deposition of deep alluvium in many coastal and inland valleys.

3.1. Palaeolithic Period

- The signs of human occupation in cave sites from at least the Upper Paleolithic Period and earlier Lower Paleolithic remains are evident in Yarimburgaz Cave near Istanbul.

- Rock engravings of animals on the walls of caves near Antalya, on the Mediterranean coast, suggest a relationship with the Upper Paleolithic art of western Europe.
- The stratified occupational debris has the potential to clarify the transitional phases between cave-dwelling society and the Neolithic economy of the first agricultural communities.

3.2. Neolithic period

- In the Middle East, the first indications of the beginning of the Neolithic transition from food gathering to food producing can be dated to approximately 9000 BCE; the true Neolithic began about 7300 BCE, by which time farming and stock breeding were well established and lasted until about 6250 BCE.
- The houses were symmetrically arranged; the discovery there of a striking collection of semi-naturalistic figurines shed new light on Neolithic art and symbolism.

3.3. Chalcolithic Period

- During this period metal weapons and tools gradually took their place beside their stone prototypes and painted pottery came generally into use.
- This period ended in the middle of the 4th century millennium BCE when the invention of writing foreshadowed the rise of the great dynastic civilizations of Egypt and Mesopotamia and was followed by periods of the Early and Middle Bronze ages.

4. Bronze Age

The period following the Chalcolithic in Anatolia is generally referred to as the Bronze Age.
Archaeological convention divides the Bronze Age into three subphases: early, middle and late.

4.1. Early Bronze Age

- The Early Bronze Age itself is customarily divided into the first, second and third phases.

- The beginning of the Bronze Age, in the mid-4th millennium BCE, corresponds in Egypt to the predynastic period and in Mesopotamia to the early Protoliterate; it lasted until late in the 2nd millennium.
- Several factors combined to produce a period of economic growth. Cultivation of the grape and production of wine brought greater agricultural prosperity.
- The adoption of the wheel increased the production of pottery and more importantly, improved transport. Seafaring seems to have increased.

Metallurgical skills previously developed became more visible and were in wider use, attested in particular by such finds as the so-called Priam's Treasure from Troy and grave goods from royal tombs.

- The metals used included copper, bronze, silver, gold, and electrum lead and iron was then far more valuable than gold.
- All these metals were obtainable in Anatolia, although the tin needed to make bronze may have been imported.
- Semiprecious stones and other materials used in association with them included rock crystal, carnelian, jasper, nephrite and obsidian, all native to Anatolia along with imported ivory, amber and lapis lazuli.
- The citadel of Troy had heavy stone walls with a mud-brick superstructure, a clay-covered glacis and projecting gates with inner and outer sets of doors.
- The number and variety of weapons found daggers, swords, spears and battle axes suggest a culture given to warfare.
- Temple had a heavily built T-shaped plan and walls decorated with painted and impressed designs. The most important technical innovation in ceramics was the introduction of the **potter's wheel,** which was the beginning of the third phase.
- The wheel-made plates and two-handled drinking vessels together with other western styles in pottery and architecture.
- The greater universality of styles likely is attributed simply to increased contact through trade and improved transport.
- The beginnings of trade with Assyria are indicated by the pottery and small objects of Kultepe were developed strongly in the Middle Bronze Age.

4.2. Middle Bronze Age

- The Middle Bronze Age, beginning about 2000 BCE, seems to have been a period of prosperity and cultural progress in the cities of Anatolia.
- Assyrian merchants, interested in the mineral wealth of the country, built up a chain of trading stations that stretched from Ashur to the Konya Plain.
- By agreement with the indigenous rulers, to whom they paid taxes, the merchants established themselves in colonies in the suburbs of Anatolian cities.
- The karum itself, known as Kanesh resembled a chamber of commerce with authority to fix prices, settle debts and arrange transport.
- The history of the Karum falls into two periods. The first occupation was the longer and more productive of the two and must have covered the reigns of Erishum, Sargon I (c 1920-1850 BCE) and Puzur-Ashur while the second was contemporary with that of Shamshi-Adad I (c 1813-c. 1781 BCE).
- This second occupation probably ended in a fire in about 1740 BCE during the reign of Samsuiluna of Babylon.
- The successive occupations of the Karum are paralleled in contemporary building levels in the main city mound where the palaces of the local rulers were situated.
- The elaborate repertoire of figurative symbolism used for this purpose, together with that found in moulded lead figurines, provides clear evidence of the existence of an indigenous Anatolian culture that persisted through the vicissitudes of economic and political change; the same tradition reappears with little alteration in the art of the Hittites.
- The Middle Bronze Age sites of western Anatolia were largely unaffected by the Assyrian trade but show a gradual increase of contact across the Aegean with Crete and mainland Greece.

5. The rise and fall of the Hittites

5.1. The rise of the Hittites

- **Hittite** members of an ancient Indo-European people who appeared in Anatolia at the beginning of the 2nd millennium BCE; by 1340 BCE they had become one of the dominant powers of the Middle East.
- Originating from the area beyond the Black sea, the Hittites first occupied central Anatolia, making their capital at Hattusa.

- Early kings of the Hittite Old Kingdom, such as Hattusilis I (c-1650-c 1620 BCE), consolidated and extended Hittite control over much of Anatolia and northern Syria.
- Hattusilis' grandson Mursilis I raided down the Euphrates River to Babylon, putting an end (c 1590 BCE) to the Amorite dynasty there.
- After the death of Mursilis, a dynastic power struggle ensued with Telipinus finally gaining control about 1530 BCE.

5.2. Hittite occupation

- After Telipinus historical records are scarce until the Hittite New Kingdom (c1400-C 1200 BCE).
- Under Suppiluliumas I (c1380-c 1346 BCE), the empire reached its height.
- Except for a successful campaign against Arzawa in southwestern Anatolia, Suppiluliumas's military career was devoted to involved struggles with the kingdom of Mitanni to the southeast and the establishment of a firm Hittite foothold in Syria.
- Under Muwatallis (c1320-c 1294 BCE) a struggle for the domination of Syria with resurgent Egypt under Seti I and Ramses II led to one of the greatest battles of the ancient world, which took place at Kadesh on the Orontes in 1299 BCE.
- Though Ramses claimed a great victory the result was probably indecisive and 16 years later, under Hattusilis III (c. 1275c. 1250 BCE) a peace treaty, mutual defence pact and dynastic marriage were concluded between the Hittites and the Egyptians.

5.3. The fall of the Hittite empire (c. 1193 BCE)

- It was sudden and may be attributed to large-scale migrations that included the Sea Peoples.
- While the heartland of the empire was inundated by Phrygians, some of the Cilician and Syrian dominions retained their Hittite identity for another five centuries, evolving politically into a multitude of small independent principalities and city-states, which were gradually incorporated by Assyria until by 710 BCE the last vestiges of Neo-Hittite political independence had been obliterated.

- Hittite cuneiform tablets discovered at Bogazkoy in modern Turkey have yielded important information about their political organisation, social structure, economy and religion.
- The Hittite king was not only the chief ruler, military leader and supreme judge but also the earthly deputy of the storm god; upon dying, he became a god.
- Hittite society was essentially feudal and agrarian, the common people being either freemen, artisans or slaves.
- Anatolia was rich in metals, especially silver and iron.
- In the empire period, the Hittites developed iron-working technology, helping to initiate the Iron Age.
- **The religion of the Hittites** is only incompletely known, though it can be characterized as a tolerant polytheism that included not only indigenous Anatolian deities but also Syrian and Hurrian divinities.
- **The plastic art** of pre-imperial Hittite culture is scarce; from the Hittite empire, however, many examples have been found of stone sculptures in a powerful, though somewhat unrefined, style.
- The art of the Late Hittite states is markedly different, showing a composite of Hittite, Syrian, Assyrian and Occasionally, Egyptian and Phoenician motifs and influences.

GS III: Science & technology

GAGANYAAN

1. Context

At a water Survival test facility operated by the Indian Navy in Kochi, the ISRO has started training for the recovery of crew members of its first human spaceflight, Gaganyaan.

2. Key Points

- At the test facility, which can simulate different environmental and sea state conditions, the space agency is finalising a standard operating procedure to

recover crew members as quickly as possible when the craft splashes down in the sea after re-entering the atmosphere.

- While preparations have been going on since 2004 when the manned space mission was first endorsed by the ISRO Policy Planning Committee, there was a lack of clarity on when exactly the mission would be launched, although the target initially in the discussion was 2015.
- In May 2016, the government told Lok Sabha, as it had done earlier that there was no plan for a manned mission to be launched in the "**near future**".
- The mission would now be completed for less than Rs. 10, 000 crores.

3. The manned space mission

- A manned space mission is very different from all other missions that ISRO has so far completed.
- In terms of complexity and ambition, even the **mission to the Moon (Chandrayaan)** and **Mars (Mangalyam)** are nowhere in comparison.
- For a manned mission, the key distinguishing capabilities that ISRO has had to develop include the ability to bring the spacecraft back to Earth after the flight and to build a spacecraft in which astronauts can live in Earth-like conditions in space.
- Over the years, ISRO has successfully tested many of the technologies that are required, but many others are still to be developed and tested.

4. About GSLV Mk-III rocket

- One of the most important requirements is the development of a launch vehicle that can carry heavy payloads into space.
- The spacecraft carrying human beings called the crew module is likely to weigh over 5 to 6 tonnes.
- ISRO's main launch vehicle, the PSLV (Polar Satellite Launch Vehicle), which carried the Chandrayaan and Mangalyaan missions too, can carry payloads that are barely up to 2 tonnes and that too only to orbits at about 600 km altitude from the Earth's surface.
- That is why the development of GSLV Mk-III, a launch vehicle with capabilities to deliver much heavier payloads much deeper into space was necessary.

5. About Gaganyaan

- After three decades of efforts, mainly concentrated on developing an indigenous cryogenic engine to power the rocket, ISRO successfully tested GSLV Mk-III, now called LVM-3 (Launch Vehicle Mark-3), in an experimental flight in December 2014.
- Then, in June last year, ISRO successfully launched the first "developmental" flight of LVM-3, which carried the GSAT-19 satellite into space.
- The LVM-3 is the declared launch vehicle for taking the manned crew module into space. Over the next few years, many more flights of GSLV are scheduled.
- These will help ISRO in perfecting the cryogenic technology for sending up heavier and heavier payloads.
- The government approved the funding for the next 10 flights of GSLV MK-III at an estimated cost of Rs 4, 338.2 crores.
- This was supposed to take care of GSLV Mk-III missions till 2024.

5.1. Reentry and recovery tech

- The satellites normally launched by ISRO, like those for communication or remote sensing are meant to remain in space, even when their life is over.
- Even Chandrayaan and Mangalyaan were not meant to return to Earth.
- Any manned spacecraft, however, needs to come back. This involves mastering the highly complicated and dangerous reentry and recovery ability.
- While rentering Earth's atmosphere, the spacecraft needs to withstand very high temperatures, over several thousand degrees, which is created due to friction.
- Also, the spacecraft needs to reenter the atmosphere at a very precise speed and angle and even the slightest deviation could end in disaster.
- The first successful experimental flight of GSLV Mk-III on December 18, 2014, also involved the successful testing of an experimental crew module that came back to Earth after being taken to an altitude of 126 km into space.
- Called the Crew module Atmospheric Reentry Experiment (CARE), the spacecraft reentered the atmosphere at about 80 km altitude and landed in

the sea near the Andaman and Nicobar Islands from where it was recovered by the coast Guard.

- The external configuration of that crew module was the same as that to be used in the manned flight. Many more tests would be done over the next few years.

5.2. Crew Escape System

- This is a crucial safety technology, involving an emergency escape mechanism for the astronauts in case of a faulty launch.
- The mechanism ensures the crew module gets a warning of anything going wrong with the rocket and pulls it away to a safe distance, after which it can be landed either on sea or on land with the help of attached parachutes.
- On 5th July 2018, ISRO completed the first successful flight of the crew escape system.
- A simulated crew module weighing about 3.5 tonnes was launched from Sriharikota.
- It reached 2.7 km into space before unfurling its parachutes and floating back to the Earth's surface.
- The system is likely to undergo many more tests in the coming years.

5.3.. Life support

- The Environmental Control and Life Support System (ECLSS) is meant to ensure that conditions inside the crew module are suitable for humans to live comfortably.
- The inside of the crew module is a twin-walled sealed structure that will recreate Earthlike conditions for the astronauts.
- It would be designed to carry two or three astronauts.

The ECLSS maintains a steady cabin pressure and air composition, removes carbon dioxide and other harmful gases, controls temperature and humidity and managers parameters like fire detection and suppression, food and water management and emergency support.

- While the layout and design of the ECLSS have been finalised, its many individual components and systems are in the process of being tested.
- The design and configuration of the inside of the crew module have also been finalised.
- Ground testing will have to be followed by tests in the space orbit while simulating zero gravity and deep vacuum.

5.4. Astronaut training

- In the early part of the planning process, a proposal for setting up an astronaut training centre in Bangalore was floated. Initially targeted by 2012, it is yet to take off.
- While ISRO still plans to set up a permanent facility, the selected candidates for the first manned mission will most likely train at a foreign facility.
- Candidates will need to train for at least two years in living in zero gravity and dealing with a variety of unexpected experiences of living in space.
- Some training would also be imparted at the Institute of Aerospace Medicine of the Indian Air Force at Bengaluru.

6. From an idea to a plan

August 2004: ISRO Policy Planning Committee recommends manned space mission.
November 2006: National Committee comprising 80 scientists and technocrats endorses the proposal.
September 2007: First Public announcement of the human space programme.
February- March 2009: Another committee, comprising Montek Singh Ahluwalia, R Chidambaram, Roddam Narasimha, M G K Menon, Yash Pal, M S Swaminathan and K Radhakrishnan discusses the desirability and feasibility of the programme and expresses support.
April 2010: Failure of GSLV-D3
December 2010: Failure of GSLV-F06
December 18, 2014: Successful testing of experimental flight of GSLV Mk-III; this also successfully tests an experimental crew module, demonstrating reentry capability.
June 2017: First developmental flight of GSLV Mk-III
July 2018: The first successful flight of the crew escape system

August 15, 2018: Prime Minister announces manned mission to take place before 2022.

GS III: Science & technology

CRYPTOJACKING

1. Context

Cryptojacking attacks on computer systems have gone up by 30% to 66.7 million in the first half of 2022 compared to the first half of last year, according to a report by SonicWall, a US-based cybersecurity firm. While volume increases were widespread, some business sectors were hit harder than others, such as the finance industry, which saw a rise of 269%," the report said.

2. What is Cryptojacking?

Cryptojacking is a cyber attack wherein a computing device is hijacked and controlled by the attacker, and its resources are used to illicitly mine cryptocurrency. In most cases, the malicious programme is installed when the user clicks on an unsafe link, or visits an infected website and unknowingly provides access to their Internet-Connected device.

3. Why is Cryptojacking done?

- Coin mining is a legitimate, competitive process used to release new crypto coins into circulation or to verify new transactions. It involves solving complex computational problems to generate blocks of verified transactions that get added to the blockchain.
- The reward for the first miner who successfully manages to update the crypto ledger through this route is crypto coins.
- But the race to crack this 64-digit hexadecimal number code needs considerable computing power involving state-of-art hardware, and electrical power to keep the systems involved up and running.

- Cryptojackers co-opt devices, servers, and cloud infrastructure, and use their resources for mining. The use of 'stolen' or crypto-jacked resources slashes the cost involved in mining.

4. Methods to detect Cryptojacking

Cryptojacking is designed to be as undetectable as possible. However, these four main symptoms are worth watching for:

- **Poor performance:** Poor performance symptoms of crypto-jacking. Devices affected may run slower than usual or crash at unusual moments due to strain on processing power from the extra workload.
- **Overheating:** Overheating is a common result. Fans in infected devices run faster than usual, or batteries may overheat if a crypto jacking script is taxing the processor of an infected device. Overheating can damage a device or shorten its life span.
- **High electricity costs:** High electricity costs are also a sign of an attack. The energy and processing power required for mining draw significant electricity.
- **Central Processing Unit (CPU):** The CPU use spikes in response to crypto-jacking. Victims with windows can check their CPU use in Activity Monitor or Task Manager when visiting sites that run little or no media content. If users notice an odd spike, this may indicate a crypto-jacking cyber attack. However, crypto-jacking malware can be written to hide as legitimate processes and be hard to detect through this method.

5. Why should this be a concern?

- Cryptojacking is hard to detect and the victims of these attacks mostly remain unaware that their systems have been compromised.
- Apart from individuals, businesses too are on the target list of cryptojackers.
- According to the report, cryptojacking incidents targeting the retail industry rose by 63% year-to-date, while similar attacks on the financial industry skyrocketed by 269%.
- The primary impact of cryptojacking is performance-related, though it can also increase costs for the individuals and businesses affected because coin mining uses high levels of electricity and computing power.

6. How to Prevent Cryptojacking?

Cryptojacking is similar to other types of malware attacks and so are its prevention techniques. The following methods are some of the best ways to prevent cryptojacking attacks:

- **Use strong cybersecurity protection:** Security admins should use strong antimalware and cybersecurity software built to detect the presence of malicious code, such as crypto mining software. They should also ensure their organizations implement the latest operating systems, web browsers, and cybersecurity software updates.
- **Use anti-crypto jacking browser extensions:** Browser extensions such as minor block and No Coin, block crypto jacking software running in web browsers.
- **Use ad blocker and disable Javascript:** Using a strong ad blocker and disabling Javascript can prevent crypto-jacking software from running in web browsers however, some crypto-jacked ads are designed to evade ad blockers.
- **Secure servers and cloud configurations:** Publicly exposed servers and cloud services are vulnerable to crypto jacks and, as such, should be identified, rooted out, and/or secured.
- **Use software composition analysis (SCA):** SCA technology can identify what open-source code is being used in software and security.
- **Block infected sites:** Blocking sites known to host crypto jacking software or that have outdated plugins and security keeps users from accidentally accessing them.

- **Stay up to date:** Crytpojacking is a constantly evolving threat, and staying up to date on the latest attack methods keeps users aware of what security threats they might be at risk for.

GS III: Science & technology

MUONS

1. Context

As per a new study, researchers are examining the fortress wall of Xi'an, an ancient city in China, by using tiny outer space particles that can penetrate hundreds of meters of stone surfaces Known as Muons, these particles have helped them find small-density anomalies, which are potential safety hazards, inside the wall.

2. Key points

- Published in the Journal of Applied Physics, the study, "**High-precision muography in archaeogeophysics: A case study on Xi' an defensive walls**", has been conducted by a team of scientists from Lanzhou University, China and the China Institute of Atomic Energy.
- Xi'an's wall is 12 metres high and 18 metres thick.
- To analyse this 14-kilometre-long rampart, researchers deployed a technique called muon tomography or muography, which uses muons to generate three-dimensional images of such large structures.
- Although muon tomography was first used in the 1960s, it has only recently been found widespread utilisation among researchers, particularly in the field of archaeology.
- With unique advantages, muography has gained increasing attention from archaeologists as a novel and innovative tool to investigate large-scale archaeological sites.
- This approach may be especially helpful for identifying endangered cultural relics and monuments.

3. About Muons

- Muons are subatomic particles raining from space.
- They are created when the particles in Earth's atmosphere collide with cosmic rays clusters of high-energy particles that move through space at just below the speed of light.
- About 10, 000 muons reach every square metre of the Earth's surface a minute.
- These particles resemble electrons but are 207 times as massive. Therefore, they are sometimes called "**fat electrons**".

- Because muons are so heavy, they can travel through hundreds of metres of rock or other matter before getting absorbed or decaying into electrons and neutrinos.
- In comparison, electrons can penetrate through only a few centimetres. Muons are highly unstable and exist for just 2.2 microseconds.

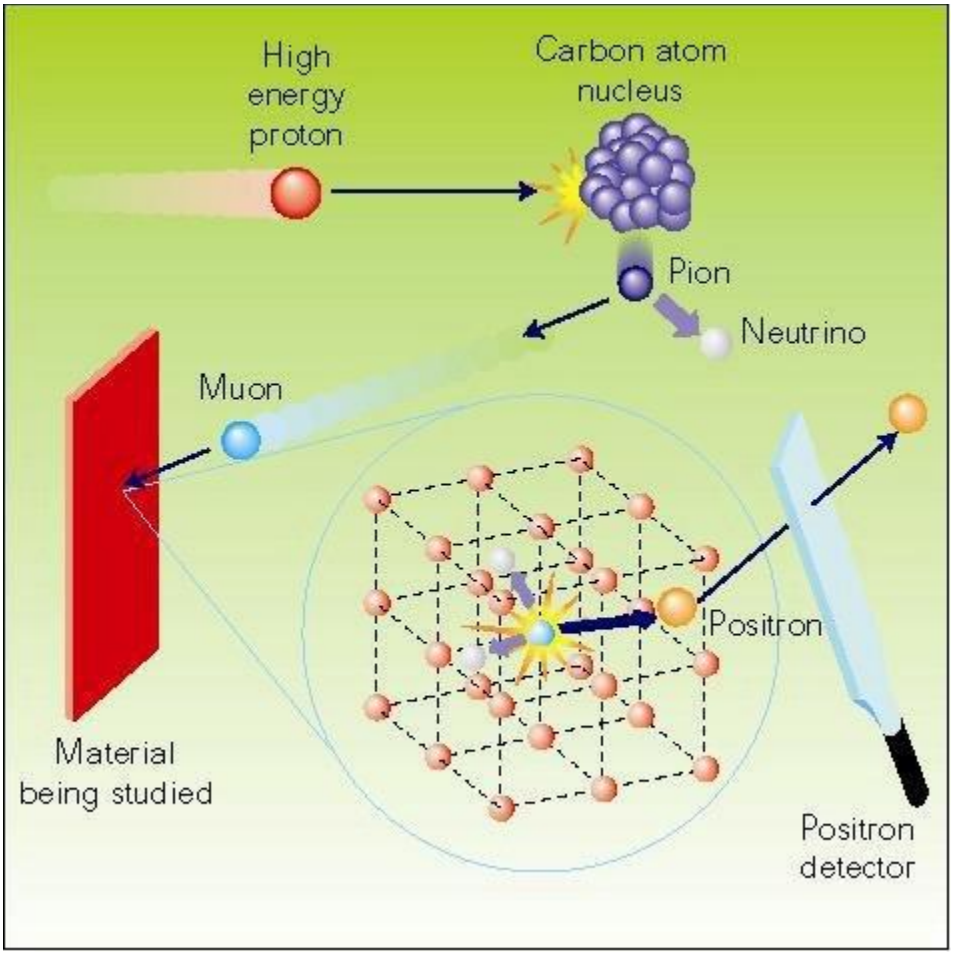


Image Source:NMI3.eu

4. Muon tomography or muography

- Muography is conceptually similar to X-ray but capable of scanning much larger and wider structures, owing to the penetration power of muons.
- As these high-energy particles are naturally produced and ubiquitous, all one needs to do is place a muon detector underneath, within or near the object of interest.

- The detector then tracks the number of muons going through the object from different directions, to form a three-dimensional image.
- According to the journal Proceedings of the National Academy of Sciences of the United States of America (PNAS), the image is then compared with a muon image of the "**free sky**".
- This indicates how many muons have been blocked.
- The final picture is essentially a shadow of the object, in the light of cosmic muons.

5. Muons and archaeology

- The technique was first used in the late 1960s when Nobel Laureate and US experimental physicist Luis Alvarez joined hands with Egyptologists to search for hidden chambers in the Pyramid of Khafre, Giza. Noting was found at the time.
- However, in 2017, modern archaeologists repeated the experiment with more sophisticated and advanced muon detectors and stumbled upon a major finding.
- By placing several detectors in the queen's chamber and adjacent corridor within the pyramid and at its base on the north side, the archaeologists were able to discover a previously unknown chamber at least 30 meters long.
- It was the first major inner structure to be found in the pyramid since the 19th century.
- Much like the 2017 experiment, scientists of the latest study also used a muon detector called CORMIS (Cosmic Ray Muon Imaging System), to examine the wall of Xi'an city.
- To collect enough data for scanning the whole structure, they deployed six detectors for a week at a time.
- The survey data are carefully processed with advanced statistical methods newly introduced in muography and the results indicate density anomalies inside the rampart with unprecedented levels of precision.

6. Uses of muography beyond archaeology

- A part of archaeology, muography has found use in customs security, internal imaging of volcanoes and others.

- Around 2015, scientists used the technique to look inside the Fukushima nuclear reactors after the 2011 earthquake and tsunami in Japan.
- As the site was highly radioactive, they put the two muon detectors in 10-centimetre-thick boxes to protect them from radiation and then carried out the scanning.
- Muography is also being used by researchers to analyse Mount Vesuvius, a volcano in Italy.
- According to a 2022 study, with the help of this technique, researchers are trying to understand the finer details of the volcano's internal structure.
- They hope that the data will play a crucial role in predicting what hazards to expect in an eventual eruption.

GS III: Science & technology

LITHIUM IN J&K

1.Context:

The Geological Survey of India (GSI) **has established "inferred" lithium resources** of 5.9 million tonnes in Salal-Haimana area of Reasi District of Jammu and Kashmir. These resources have been established as part of the "Reasi Sersandu-Kherikot-Rahotkot-Darabi" mineral block, where prospecting has been ongoing since 2021-22

2.Key Takeaways

- Under the United Nations Framework for Classification for Reserves and Resources of Solid Fuels and Mineral Commodities (UNFC 1997), the stage of prospecting is categorised as 'G4' when it entails reconnaissance surveys a fairly advanced stage of prospecting
- The finds in this case are learnt to include bauxite (the ore for aluminium) and rare earth elements, alongside lithium
- The finds in this case are learnt to include bauxite (the ore for aluminium) and rare earth elements, alongside lithium
- There are two caveats with the latest lithium find:

1.The new find is categorised as “inferred” one of three categories that mineral resources are subdivided into, in order of increasing geological confidence.

The “inferred” mineral resource is the part of a resource for which quantity, grade and mineral content are estimated only with a low level of confidence based on information gathered from locations such as outcrops, trenches, pits, workings and drill holes that may be of limited or uncertain quality, and also of lower reliability from geological evidence

2.The lithium find in J&K, in inferred terms, is also comparatively small, considering that proven reserves in Bolivia are 21 million tonnes, 17 million tonnes in Argentina, 6.3 million tonnes in Australia, and 4.5 million tonnes in China

- The country currently imports all its lithium needs
- The domestic exploration push, which also includes exploratory work to extract lithium from the brine pools of Rajasthan and Gujarat and the mica belts of Odisha and Chhattisgarh, comes at a time when India has stepped up its economic offensive against China a major source of lithium-ion energy storage products being imported into the country
- Currently, India is almost entirely dependent on import of these cells and the move to ink sourcing pacts for lithium is seen as another salvo in the front against imports from China, the major source of both the raw material and cells
- India is seen as a late mover as it attempts to enter the lithium value chain, coming at a time when EVs are predicted to be a sector ripe for disruption
- Over 165 crore lithium batteries are estimated to have been imported into India between FY17 and FY20 at an estimated import bill of upwards of $3.3 billion
- This report, along with 15 other resource-bearing geological reports and 35 geological memorandums, were handed over to respective state governments during the CGPB meeting
- Of these 51 mineral blocks, five blocks pertain to gold, and other blocks are of commodities like potash, molybdenum, base metals spread over 11 states and Union Territories including J&K, Andhra Pradesh, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Madhya Pradesh, Odisha, Rajasthan, Tamil Nadu and Telangana
- The blocks were prepared based on the work carried out by GSI from field seasons 2018-19 until February 2023

- According to the Ministry of Mines' approved annual Field Season programme (prospecting plan), the GSI takes up different stages of mineral exploration reconnaissance surveys (G4), preliminary exploration (G3), and general exploration (G2) as per the guidelines of UNFC and the Minerals (Evidence of Mineral Contents) Amendment Rules, 2021 (Amended MMDR Act 2021) for augmenting mineral resource for various mineral commodities, including lithium

3.Extraction of Lithium

- Lithium can be extracted in different ways, depending on the type of the deposit generally either through solar evaporation of large brine pools, or from hard-rock extraction of the ore
- In India, there is some potential to recover lithium from brines of Sambhar and Pachpadra areas in Rajasthan, and Rann of Kutch, Gujarat.
- The major mica belts located in Rajasthan, Bihar and Andhra Pradesh and the pegmatite belts in Odisha, Chhattisgarh, alongside rock mining being undertaken at Mandya, Karnataka, are other potential geological domains of the country
- This is part of a concerted domestic exploration push for the alkali metal a vital ingredient of the Lithium-ion rechargeable batteries that power electric vehicles (EVs), laptops and mobile phones
- The Atomic Minerals Directorate for Exploration and Research (AMD), an arm of the Department of Atomic Energy, had earlier conducted preliminary surveys that had shown the presence of lithium resources of 1,600 tonnes in the igneous rocks of the Marlagalla–Allapatna region of Karnataka's Mandya district.
- The AMD has been carrying out exploration, both on surface and some subsurface exploration, to augment lithium resources in the potential geological domains of the country

4.About Lithium

Lithium is a chemical element with the symbol Li and atomic number 3. It is a soft, silvery-white alkali metal. Under standard conditions, it is the least dense metal and the least dense solid element

Lithium is one of the key components in electric vehicle (EV) batteries. As the world transitions from gasoline and diesel to electric vehicles, the demand for

lithium is going up rapidly too. Lithium is used not only in EVs but also in batteries for gadgets like laptops and mobile phones. It has also found application in the glass and ceramics industries
In fact, lithium has been dubbed “white gold” for its widespread usage in items indispensable to modern-day living

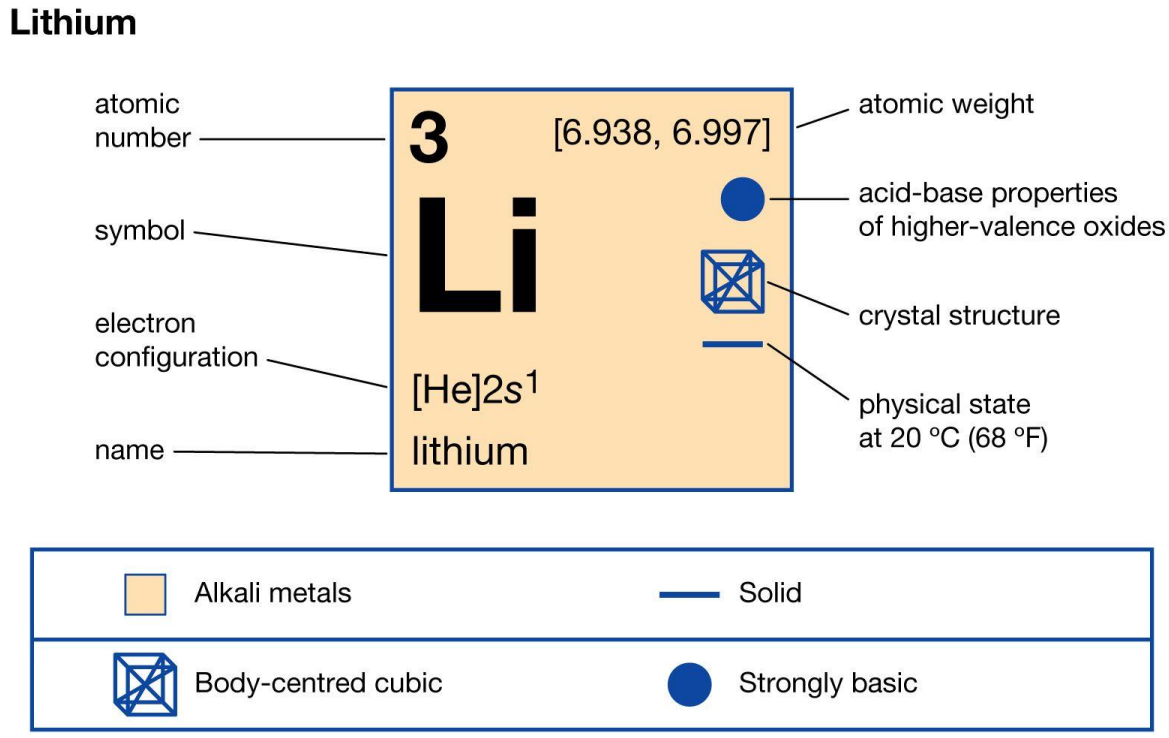


Image Source: Britanica

GS III: Science & technology

SSLV-D2

1. Context

In its second development flight slated for February 10 morning, the Small Satellite Launch Vehicle (SSLV-D2) will place the Indian Space Research Organisation (ISRO) earth observation satellite EOS-07 and two co-passenger

satellites- **Janus 1 and AzaadiSat2** developed by start-ups in a 450-km circular orbit around the Earth.
The mission of ISRO's smallest vehicle scheduled for 9.18 am will last only 15 minutes. It will be ISRO's first launch of 2023.

2. The Aim of the launch

- The new vehicle was developed to capture the emerging small and microsatellite commercial market, with launches offered on demand.
- The rocket can be assembled by a small team in only a few days, compared to the six months and around 600 people it takes for ISRO's workhorse PSLV.
- The plan is to make it available in a week the assembly can be done in two days, (followed by) two days of testing and in the next two days, are doing the rehearsal and launch already done this time.

Image Source: ISRO

3. Second attempt at a launch

- The launch vehicle uses three solid stages followed by a liquid-fuel-based Velocity Trimming Module (VTM) to place satellites in orbit.
- The vehicle's first development flight which took place last August after repeated delays due to the pandemic failed to place the satellites in a precise orbit.
- This was because of excessive vibration sensed by accelerometers during the second stage separation, which made the onboard system "**think**" that the sensors were faulty.
- For the second flight, structural changes have been made to the equipment bay, along with changes in the separation mechanism for stage 2 and logic changes for the onboard system.
- A new vehicle is declared operational by the space agency after it completes two successful development flights.
- The last vehicle to be declared operational was the GSLV MkIII, now called LVM 3, When carried Chandrayann-2 in 2019.

4. About Janus-1

- Janus-1 technology demonstrator satellite built by United States-based Antaris and its Indian partners XDLinks and Ananth Technologies.
- The creation of a standardised satellite bus on which multiple payloads can be attached just like lego blocks.
- This will enable companies to quickly and cheaply launch their payloads.
- Once launched, we can handle the operations for them or give the companies access to our platform so that can control it.
- A satellite bus is the main structure of a satellite on which the payloads can be used for multiple applications such as earth observation, signal monitoring or ship tracking rest.
- The company aims to make satellite buses of different sizes, for satellites weighing around 100kg.

Janus-1 which weighs only 10.2 kg, is a six-unit cube satellite with five payloads on board two from Singapore and one each from Kenya, Australia and Indonesia. The entire satellite was built in 10 months, less than half the time it usually takes to manufacture satellites of this size.

5. About AzaadiSat 2

- The payloads have been built by 750 girl students from across India.
- A similar satellite by SpaceKidzIndia was launched aboard SSLV-D1 in August last year.
- The payloads remain the same LoRa amateur radio, a sensor to measure radiation levels in space and sensors to measure the health of the satellite such as temperature, reset count and intertidal data but this second satellite has an additional feature.

6. Space Awareness Programme

- **SpaceKidzIndia** which aims to promote space awareness among children has made the satellite expandable: the 8-unit satellite will have a spring mechanism-based external frame which will open up once the satellite is in orbit.
- After the frame opens up, the satellite will become four times its size.
- This external frame will host a new cheaper type of solar panel to provide energy to the satellite.
- Energy for sustaining longer durations in space is one of the challenges of small satellites, which is why we have made the structure expandable. This is the first time such a thing is being tried out.
- The small size at the time of launch with a bigger power pack means the satellite will easily fit in the launch vehicles and start-ups will spend less on launch services.
- **One hundred and fifty of the 750 students developed some of the payloads**.
- The satellite will also carry the G20 logo to space and the NCC song to celebrate 75 years of the organisation.
- The **space song** is about girl children and students of rural India dreaming of becoming space scientists has been composed by Devi Sri Prasad.

GS III: Science & technology

BARD VS CHAT GPT

1. Context

Google has made a decisive move in the generative artificial intelligence (AI) race, announcing that it is working on a competitor to ChatGPT called 'Bard'. Google has said that its chatbot would launch "in the coming weeks" - a clear response to ChatGPT, the hugely sensational Microsoft-backed AI chatbot that has been developed by the tiny San Francisco-based startup OpenAI.

2. What is ChatGPT?

- ChatGPT is a variant of GPT (Generative Pre-trained Transformer) which is a large-scale neural network-based language model developed by OpenAI.
- GPT models are trained in vast amounts of text data to generate human-like text.
- It can generate responses to a wide range of topics, such as answering questions, providing explanations, and engaging in conversations.
- In addition to being able to "admit its mistakes, challenge false premises, and refuse unsuitable requests," the ChatGPT can also "answer follow-up questions."
- The chatbot was also trained using Reinforcement Learning from Human Feedback (RLHF).

3. How will Google's Bard work?

- The service will use artificial intelligence to generate answers in a text when people type in queries, similar to what ChatGPT does.
- In a blog post, Google said Bard can help people perform tasks like planning a baby shower, comparing two Oscar-nominated movies, or explaining discoveries by NASA to a 9-year-old child.
- Bard is based on Google’s AI model called LaMDA, which the company introduced in 2021 as its generative language model for dialogue applications which can ensure that the Google Assistant would be able to converse on any topic.

4. Key differences between Bard and ChatGPT

- The services that Google's Bard and ChatGPT would offer are similar. Users will have to key in a question, a request, or give a prompt to receive a human-like response.
- Microsoft and Google plan to embed AI tools to bolster their search services Bing and Google search, which account for a big chunk of revenue.
- Both technologies can distill complex information and multiple perspectives into easy-to-digest formats, but the most apparent difference is Bard's ability to include recent events in the responses.
- Though not immediately clear how the two services will differ, it is certain that Alphebet's Bard will have access to more data.
- Bard draws on information from the internet, while ChatGPT has access to data until 2021.

5. LaMDA Vs GPT

- Bard is based on LaMDA, short for Language Model for Dialogue Applications. The AI-generated text with such skill that a company engineer last year called it sentient, a claim the technology giant and scientists widely dismissed.
- OpenAI's GPT, or Generative Pre-trained Transformer, was first released in 2020, and the GPT 3.5 series of language models that finished training in early 2022 is the backbone of ChatGPT.
- ChatGPT sometimes writes plausible-sounding but incorrect or nonsensical answers.

6. Are there other Alternatives?

- In the two months after ChatGPT's launch, the number of tech companies has doubled down on generative AI technology, while a number of startups are independently working on their own projects.
- Baidu, China's answer to google, is the latest company to join the frenzy. Its AI is called Erine.

GS III: Science & technology

CAR T-CELL THERAPY

1. Context

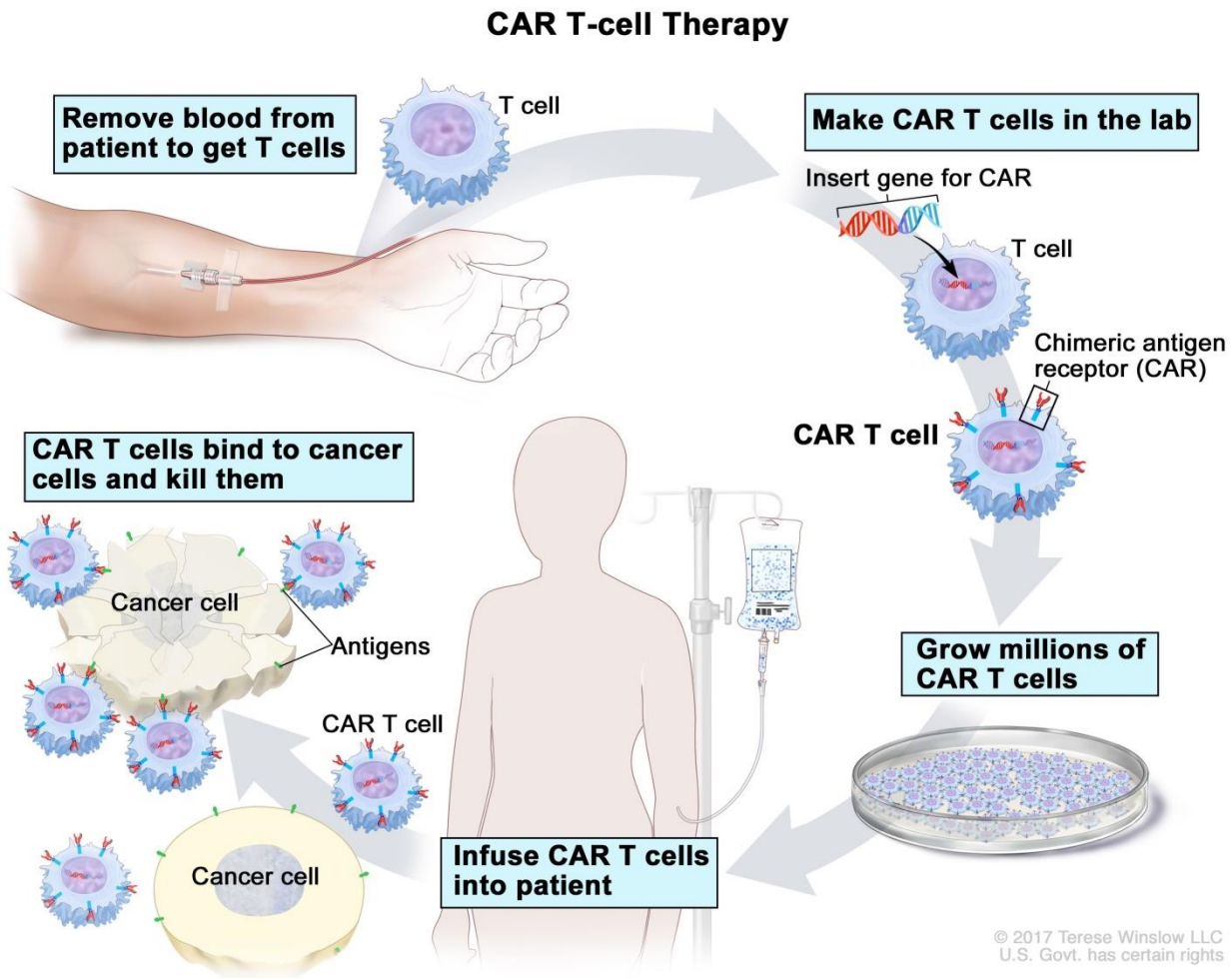
The three major forms of treatment for any cancer is surgery (removing cancer), radiotherapy (delivering ionizing radiation to the tumor), and systemic therapy (administering medicines that act on the tumor). Surgery and radiotherapy have been refined significantly over time whereas advances in systemic therapy have been unparalleled. A new development in this front, currently holding the attention of many researchers worldwide is the CAR T-cell therapy.

2. What is CAR T- Cell therapy?

A type of treatment in which a patient's T cells (a type of immune system cell) are changed in the laboratory so they will attack cancer cells. T cells are taken from a patient's blood. Then the gene for a special receptor that binds to a certain protein in the patient's cancer cells is added to the T cells in the laboratory. The special receptor is called a chimeric antigen receptor (CAR). Large numbers of CAR- T cells are grown in the laboratory and given to the patient by infusion. CAR T- cell therapy is used to treat certain blood cancers, and it is being studied in the treatment of other types of cancer. Also called chimeric antigen receptor T-cell therapy.

3. What are CAR T-Cells?

- Chimeric antigen receptor (CAR) T-cell therapies represent a quantum leap in the sophistication of cancer treatment. Unlike chemotherapy or immunotherapy, which require massproduced injectable or oral medication, CAR T-cell therapies use a patient’s own cells.
- They are modified in the laboratory to activate T-cells, a component of immune cells, to attack tumors. These modified cells are then infused back into the patient’s bloodstream after conditioning them to multiply more effectively.
- The cells are even more specific than targeted agents and directly activate the patient’s immune system against cancer, making the treatment more clinically effective. This is why they’re called ‘living drugs’.



4. How does it work?

- The therapy targets leukaemia and lymphoma. Leukaemia is a cancer of blood-forming tissues, including bone marrow. Lymphoma is a cancer of the lymphatic system, which is part of the body's germ-fighting network.
- It uses lentiviral technology. In gene therapy, this is a method of inserting, modifying or deleting genes in organisms using lentivirus, a family of viruses responsible for diseases such as AIDS (acquired immunodeficiency syndrome).
- As a part of the treatment, a specific type of white blood cells and T cells are changed in the lab so they can find and destroy cancer cells.
- It is also sometimes referred to as a type of cell-based gene therapy because it involves altering genes inside T cells to help them attack cancerous cells.

5. How has systemic therapy evolved?

- Systemic therapy's earliest form was chemotherapy; when administered, it preferentially acts on cancer cells because of the latter's rapid, unregulated growth and poor healing mechanisms.
- Chemotherapeutic drugs have modest response rates and significant side effects as they affect numerous cell types in the body.
- The next stage in its evolution was targeted agents, also known as immunotherapy. Here the drugs bind to specific targets on cancer or on the immune cells that help the tumour grow or spread.
- This method often has fewer side effects as the impact on non tumour cells is limited. However, it is effective only against tumours that express these targets.

6. Will it be an expensive treatment in India?

- In India, introducing any new therapy faces the twin challenges of cost and value.
- Critics argue that developing facilities in India may be redundant and/or inappropriate as even when it becomes cheaper, CAR T-cell therapy will be unaffordable to most Indians.
- Those who are affluent and require the therapy currently receive it abroad anyway.
- While this is true, it may be the right answer to the wrong question. Having access to a global standard of care is every patient's right; how it can be made more affordable can be the next step.
- Investments in developing these technologies in India represent the hope that, as with other initially expensive treatments like robotic surgery, we will be able to provide economies of scale.
- The sheer volume of patients in India has the potential to drive the cost of treatment down.

GS III: Science & technology

NON-FUNGIBLE TOKEN (NFT)

1. Context

Non-fungible tokens (NFTs) have, thanks to their ability to assign value to everything from art to music to a simple selfie, taken the world by storm. The sales of NFTs surged $25 billion in 2021 as the crypto asset exploded in popularity, fuelled by the rising interest of celebrities and tech evangelists, according to market data tracker DappRadar data analytics. However, some experts believe NFTs are a bubble that might pop.

2. What are Non-fungible Tokens (NFTs)

- Anything that can be converted into a digital form can be an NFT. Everything from your drawings, photos, videos, GIFs, music, in-game items, selfies, and even a tweet can be turned into an NFT, which can then be traded online using cryptocurrency.
- But what makes NFTs unique from other digital forms is that it is backed by Blockchain technology.
- For the uninitiated, Blockchain is a distributed ledger where all transactions are recorded. It is like your bank passbook, except all your transactions are transparent and can be seen by anyone, and cannot be changed or modified once recorded.
- NFTs are gaining massive popularity now because they are becoming an increasingly popular way to showcase and sell your digital artwork.
- Billions of dollars have been spent on NFTs since its inception which dates back to 2015, and Terra Nulius was the first NFT on Ethereum Blockchain, although this project was merely an idea that only allowed to customize of a short message which was then recorded on Blockchain.
- Then came Curio Cards, CryptoPunks, and CryptoCats in 2017, before NFTs slowly moved into public awareness, then expanded into mainstream adoption in early 2021.

3. Working of NFTs

- NFT works on blockchain as it gives users complete ownership of a digital asset. For instance, if you are a sketch artist, and if you convert your digital asset to an NFT, what you get is proof of ownership, powered by Blockchain.

- In simple words, when you list your NFT on a marketplace, you pay something called a gas fee (Transaction fee) for using the Blockchain, following which your digital art is then recorded on Blockchain, mentioning that you (your address) own the particular NFT.
- This gives you full ownership which can not be edited or modified by anyone, including the marketplace owner.
- An NFT is thus created, or as crypto enthusiasts say it is "minted", to get exclusive ownership rights. NFTs can have only one owner at a time.
- Apart from exclusive ownership, NFT owners can also digitally sign their artwork and store specific information in their NFT's metadata. This will be only viewable to the individual who bought the NFT.

4. How is an NFT different from Cryptocurrency?

- NFTs and cryptocurrencies are very different from each other. While both are built on Blockchain, that is where the similarity ends.
- Cryptocurrency is a currency and is fungible, meaning that it is interchangeable.
- For instance, if you hold one crypto token, say one Ethereum, the next Ethereum that you hold will also be of the same value. But NFTs are non-fungible, which means the value of one NFT is not equal to another.
- Every art is different from others, making it non-fungible, and unique.

5. What are the risks associated with buying NFTs?

- The emergence of fake marketplaces.
- Unverified sellers often impersonate real artists and sell copies of their artworks for half prices.
- Sharing potential phishing links during the sale to drain the participant's crypto wallets.
- Hacking the NFT collections.
- Fees and gas money can result in artists losing money.
- Technology issues like non-attachment of a purchased item to the NFT, global chip shortage, etc.
- Ownership issues like losing the login credential might result in permanent loss of owned works

- Validation of transactions requires crypto mining, which requires high-powered computers that run at a very high capacity, affecting the environment.

GS III: Science & technology

VOICE DEEPFAKES

1. Context

Several users of the social media platform 4chan, used "speech synthesis" and "voice cloning" service provider, ElevenLabs, to make voice deepfakes of celebrities like Emma Watson, Joe Rogan, and Ben Shapiro. These deepfake audios made racist, abusive, and violent comments. Making deepfake voices impersonate others without their consent is a serious concern that could have devastating consequences.

2. What are Voice Deepfakes?

A voice deepfake is one that closely mimics a real person's voice. The voice can accurately replicate tonality, accents, cadence, and other unique characteristics of the target person. People use AI and robust computing power to generate such voice clones or synthetic voices. Sometimes it can take weeks to produce such voices, according to Speechify, a text-to-speech conversion app.

3. How are voice deepfakes created?

- To create deepfakes one needs high-end computers with powerful graphics cards, leveraging cloud computing power.
  Powerful computing hardware can accelerate the process of rendering, which can take hours, days, and even weeks, depending on the process.
- Besides specialized tools and software, generating deepfakes needs training data to be fed to AI models. These data are often original recordings of the target person's voice.

- AI can use this data to render an authentic-sounding voice, which can then be used to say anything.

4. Tools used for Voice Cloning

OpenAI's Vall-e, My Own Voice, Resemble, Descript, ReSpeecher, and iSpeech are some of the tools that can be used in voice cloning.
ReSpeecher is the software used by Lucasfilm to create Luke Skywalker's voice in the Mandalorian.

5. Threats arising from the use of Voice deepfakes

- Attackers are using such technology to defraud users, steal their identity, and to engage in various other illegal activities like phone scams and posting fake videos on social media platforms.
- Voice deepfakes used in filmmaking have also raised ethical concerns about the use of the technology.
- Gathering clear recordings of people's voices is getting easier and can be obtained through recorders, online interviews, and press conferences.
- Voice capture technology is also improving, making the data fed to AI models more accurate and leading to more believable deepfake voices. This could lead to scarier situations, Speechify highlighted in their blog.

6. Ways to detect voice deepfakes

- Detecting voice deepfakes needs highly advanced technologies, software, and hardware to break down speech patterns, background noise, and other elements.
- Research labs use watermarks and blockchain technologies to detect deepfake technology, but the tech designed to outsmart deepfake detectors is constantly evolving.
- Programmes like Deeptrance are helping to provide protection. Deep trance uses a combination of antivirus and spam filters that monitor incoming media and quarantine suspicious content.
- Last year, researchers at the University of Florida developed a technique to measure acoustic and fluid dynamic differences between original voice samples of humans and those generated synthetically by computers. They estimated the arrangement of the human vocal tract during speech generation

and showed that deepfakes often model impossible or highly unlikely anatomical arrangements.

- Callback functions can end suspicious calls and request an outbound call to the account owner for direct confirmation.
- Multifactor authentication (MFA) and anti-fraud solutions can also reduce deepfake risks.

GS III: Disaster management

DISASTER MANAGEMENT

1. Context

In a bid to provide relief to the quake-hit Turkey, India is sending an Army medical team, National Disaster Relief Force (NDRF) personnel, and medical supplies. The West Asian nation was struck by a series of massive earthquakes on Monday (February 6) killing over 5,000 people and injuring thousands.

2. Disaster Management

Disaster/emergency management is the method of dealing with and avoiding risks. It involves preparation and ways to deal with a disaster before it happens, disaster response (e.g. safe evacuation, mass confinement, and sanitization, etc.), and not only supporting but also guiding and rebuilding society after natural or human-made disasters have occurred.
Disaster Management is a process of preparation, management, planning, and implementation of measures before or during a disaster. These measures are important to

- Reduce and prevent any kind of threats during a disaster
- Implement proper research and planning to sustain any disaster
- Prompt response in any threatening situation
- Evacuation and rescue missions to be carried out efficiently
- Rehabilitation for the affected people

3. National Disaster Management Authority (NDMA)

The National Disaster Management Authority (NDMA) is the apex statutory body for disaster management in India.
The NDMA was formally constituted on 27th September 2006, in accordance with the Disaster Management Act, 2005 with Prime Minister as its Chairperson and nine other members, and one such member to be designated as Vice-Chairperson.
Mandate:
Its primary purpose is to coordinate response to natural or man-made disasters and for capacity-building in disaster resiliency and crisis response. It is also the apex body to lay down policies, plans and guidelines for Disaster Management to ensure timely and effective response to disasters.
Vision:
To build a safer and disaster resilient India by a holistic, proactive, technology driven and sustainable development strategy that involves all stakeholders and fosters a culture of prevention, preparedness and mitigation.

4. Determinants

- The ethos of India's humanitarian assistance can be traced to its cultural and spiritual values.
- All the major religions - Hinduism, Christianity, Buddhism, and Islam - espouse solidarity with the suffering.
- The government acknowledges the importance of the UN's four fundamental humanitarian principles of humanity, neutrality, impartiality, and independence.
- India is also a signatory to all four Geneva Conventions and participated in the 2016 World Humanitarian Summit.
- The South-South Cooperation(SSC)'s foreign policy principle also informs and prompts India's humanitarian actions, with India often seeking to respond in accordance with the expressed needs of recipient country governments.

5. Previous instances of India sending aid to natural disaster-hit countries

United States of America

An Indian Air Force IL-76 aircraft delivered 25 tonnes of relief supplies for the Hurricane Katrina victims at the Little Rock Air Force Base, Arkansas on September 13, 2005. The relief supplies comprised 3,000 blankets, bed sheets, tarpaulins, and personal hygiene items.

Maldives

After the 2004 Tsunami, the Indian government announced a composite package worth five crore rupees. Under "Operation Castor", 50 sorties were undertaken and four aircraft and two Naval ships were engaged in relief operations. Repairing and restoring generators and communication, providing drinking water, and setting up medical camps on ships were also done.

Sri Lanka

India sent its forces to carry out rescue operations, called "Operation Rainbow", in Sri Lanka hours after the Tsunami struck the country on December 26, 2004. Not only this, India provided medical assistance to thousands of victims by setting up medical camps in coordination with the local civil and military health authorities. Preventative medication and vaccines were also supplied.

Myanmar

When cyclone Nargis hit Myanmar in 2008 killing at least 20,000 people, India was among the first countries to send aid to them. It gave 125.5 tonnes of relief material, including medicines, clothing, utensils, water tanks, tents, and tarpaulin.

Japan

The 2011 Tsunami wreaked havoc in Japan. Apart from providing relief materials, India also sent 46 members of the National Disaster Response Force (NDRF) to search and rescue in the town of Onagawa. It was their first overseas Operation. The team included a doctor, three officers, six inspectors, two paramedics, and constables, and carried 9,000 kg of equipment and food.

Nepal

In the aftermath of the 2015 Nepal earthquake, the NDRF deployed 16 of its urban search and rescue (USAR) teams, which comprised more than 700 rescuers in the country. They rescued 11 injured persons and retrieved 133 dead bodies from the rubble. The teams also organized six medical camps and attended to 1,219 persons. Indian authorities sent more than 1,176 tonnes of relief materials to Nepal.

GS III: Economy

ANGEL TAX

1. Context

A recently proposed detail has Indian start-ups worried. These new-age firms, that offer their shares to foreign investors, may have to pay **"angel tax",** which was earlier only supposed to be paid for investments raised by resident Indian investors, as per a motion made in the Finance Bill, 2023.
The move could adversely impact financing available to the start-ups, which have already been reeling under a funding winter since 2022, industry insiders are speculating.

2. The Proposed Change

- The Finance Bill, 2023, has proposed to amend Section 56(2) VII B of the Income Tax Act.
- The provision states that when an unlisted company, such as a start-up, receive equity investment from a resident for the issue of shares that exceeds the face value of such shares, it will be counted as income for the start-up and be subject to income tax under the head "**Income from other Sources**" for the relevant financial year.
- However, with the latest amendment, the government has proposed to also include foreign investors in the ambit, meaning that when a start-up raises

funding from a foreign investor, that too will now be counted as income and be taxable.

For instance, if the fair market value of a start-up share is Rs 10 apiece and in a subsequent funding round they offer it to an investor for Rs 20, then the difference of Rs 10 would be taxed as income.

- Section 56 (2) VII B of the Income Tax Act, colloquially known as the "**angel tax**" was first introduced in 2012 to deter the generation and use of unaccounted money through the subscription of shares of the closely held company at a value that is higher than the fair market value of the firm's shares.

3. Start-ups Concerns

- The change comes as the funding for India's startups dropped by 33 per cent to $24 billion in 2022 as compared to the previous year, according to a PwC India report released in January.
- Foreign investors are a key source of funding for start-ups and have played a big role in increasing the valuation.

For instance, Tiger Global, one of the most prolific foreign investors in India has invested in over a third of the start-ups that have turned unicorns with a valuation of at least $1 billion.

- Non-resident investors were never under the scope of this tax.
  This could compel more startups to flip overseas, as foreign investors may not want to deal with additional tax liability through their investment in the startup.
- The reintroduction is completely counter-intuitive to the entire move of reverse-flipping. This will accelerate flipping overseas.

GS III: Economy

ADDITIONAL SURVEILLANCE MECHANISM

1. Context

The National Stock Exchange (NSE) on Thursday (February 2) placed Adani Enterprises, Adani Ports, and Ambuja Cements under the additional surveillance mechanism (ASM), Reuters reported. This means trading in their shares will require a 100% margin, which is aimed at curbing speculation and short-selling. The move comes as shares of Adani group companies continue to fall in the wake of accusations of stock manipulation and fraud leveled against the group by New York-based short seller Hindenburg Research.

2. What is an Additional Surveillance Mechanism (ASM)?

- The ASM was introduced on March 26, 2018, with the intention to protect investors from market volatility and unusual changes in share price.
- According to the National Stock Exchange (NSE) website, "In continuation to various surveillance measures already implemented, SEBI and Exchanges, pursuant to discussions in joint surveillance meetings, have decided that along with the aforesaid measures, there shall be Additional Surveillance Measures (ASM) on securities with surveillance concerns based on objective parameters viz. Price / Volume variation, Volatility, etc."
- The shortlisting of securities for placing in ASM is based on criteria that are jointly decided by the Securities and Exchange Board of India (SEBI) and exchanges, covering the parameters of "high low variation, client concentration, PE, close to close price variation, market capitalization, volume variation, delivery percentage, and the number of unique PANs", the NSE FAQs say.
- SEBI has not announced any probe into the Adani shares crash so far.

3. Importance of ASM in the Stock Market

- ASM is really important, keeping in mind the volatility of the Indian stock market.
- Let's understand this with an example.
- If today, a stock enters the surveillance list. After entering the ASM, it will be moved to a 5% price band on the next day, which means now its price can only move 5% upwards or downwards from the previous day's closing level.
- The stock that entered the ASM list will discontinue if it is found to break the law of 5%. We can easily conclude from this that the stock is under strict rules upon entering the ASM list.
- Now assume that from the 5th day of trading, 100% of the margin money will be required to trade the stock, and if the PE ratio is moved above 100, the stock will come under the trade-to-trade settlement.
- Also, if the PE ratio is less than 10 or the Nifty 500 index, then the stock is removed from the list.
- Hence, we can say this discourages the intraday traders from trading, and the fight among these traders leads to a decrement in the price of the stocks that are seen as a drop in the price of the stock.

4. Why should we care about ASM?

- Exchanges say that the stocks coming under the Additional Surveillance Measure do not reflect the company's condition, quality, and position.
- Contrary to this, in the BSE 500 and NIFTY500 indices, these stocks under ASM are the defeated ones.
- It looks like a panic situation is created to sell off the stocks coming under the surveillance list. Even if you think of it as not a panic situation, then also you will get stuck with that 5% band criteria.
- Being an investor is not easy as you have to monitor the fluctuations, the variations, and the changes in the market to make the best investment, irrespective of the type of investor you are, a long-term investor or a short-term investor.

5. How much have Adani Stocks Fallen?

- According to a report by the AP, Adani company shares are still losing value. Shares in Adani Enterprises fell 27% on Thursday, while six other Adani companies fell 5%-10%.
- The cumulative route in a week is now close to $108 billion is one of the biggest wipeouts in India's history.
- Gautam Adani's personal fortune sank to $72 billion from $120 billion before the Hindenburg Research report came out, according to Bloomberg's Billionaire Index.
  On Wednesday, the Adani Group called off its Rs 20,000 crore follow-on public offer (FPO) and announced it would return the money to investors.
- This means the group will no longer have the funds it had launched the FPO to raise.

GS III: Economy

DISINVESTMENT

1. Context

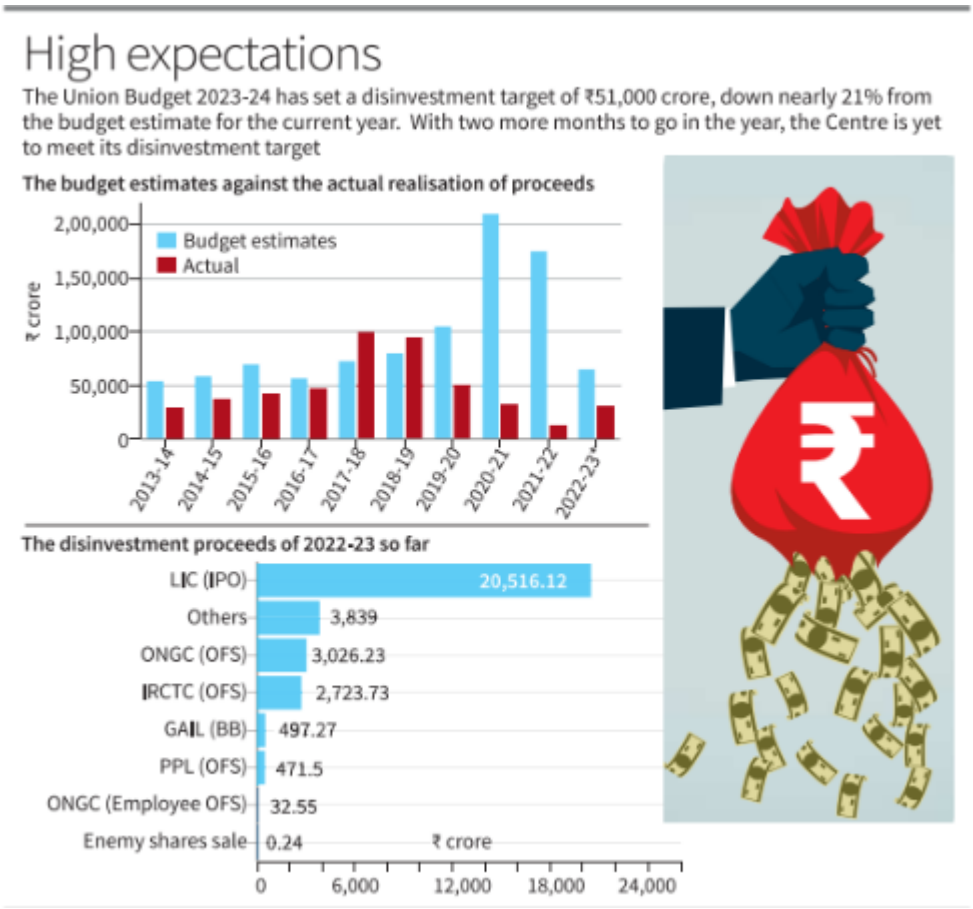
In the Union Budget for 2023-24, the government has set a disinvestment target of 51,000 crores, down nearly 21% from the budget estimate for the current year and just 1,000 crores more than the revised estimate. It is also the lowest target in seven years. Moreover, the Centre has not met the disinvestment target for 2022-23 so far, having realized 31, 106 crores to date, of which, 20,516 crores or close to a third of the budgeted estimate came from the IPO of 3.5% of its shares in the Life Insurance Corporation (LIC).

2. What is Disinvestment

Disinvestment means the act of selling or liquidating assets. The process of dilution of a government's stake in a PSU (Public sector Undertaking) is disinvestment. It allows the transfer of the government's enormous public debt of PSU to the private sector. Disinvestments, in most cases, are primarily motivated by the optimization of resources to deliver maximum returns.

3. Disinvestment Policy

- The government of India has decided to privatize the Public sector enterprises in a gradual and phased manner through disinvestment.
- It will be done by bringing down the government's equity shares in all non-strategic public sector enterprises to 26% or lower.
- The Government has decided to permit up to 49% disinvestment of equity so that the government would continue to hold 51%.



4. Goals of Disinvestment policy in India

- Decrease the financial burden from the sick, loss-making PSU's
- To help improve public finances.
- Introduce competition and market discipline amongst enterprises.
- Help in the funding of various social sector welfare initiatives.

- To encourage a wider share of ownership
- Reduce political interference in non-essential services.

6. Disinvestment policy in India

- Focus on public sector enterprises began from the second five-year plan and industrial policy resolution, in 1956.
- Disinvestment as a policy initiative began in the wake of economic liberalization, globalization, and structural reforms launched in 1991.
- PV Narasimha Rao government in 1991 initiated a disinvestment policy and announced that government would disinvest up to 20% of its equity in selected PSUs mainly through mutual funds and FIIs (Financial institutions investors).
- The next phase of disinvestment allowed more individuals like FII, Employees of the Company, etc.
- C Rangarajan Committee was appointed that recommended 49% of disinvestment.
- Major changes associated with disinvestment occurred during the regime of Atal Bihari Vajpayee that involved stake sales in Paradeep Phosphates, Hindustan Zinc, and BALCO.
- National Investment Fund (2005) was formed to which the funds raised from disinvestment were channeled.
- A new disinvestment policy was envisioned to utilize the investments in new projects. The Department of Disinvestment was renamed the "Department of Investment and Public Asset Management" (DIPAM).

7. Recent trends in Disinvestment Policy

- The government has revised its disinvestment estimate for the current financial year to ₹78,000 crores, down from ₹1.75 lakh crore envisaged in the budget estimate (BE) on February 1 last year, which is a 55.4% reduction
- The disinvestment target for 2022-23 is Rs 65,000 crore. This is 17% lower than the revised estimate of 2021-22 (Rs 78,000 crore).
- So far, the total disinvestment government proceeds are ₹12,029.9 crore, which includes ₹2,700 crore receipt from Air India privatization and a balance of ₹9,330 crores through the sale of minority stakes in CPSEs.

- In the current financial year (2022), major disinvestments planned include the IPO of LIC, Bharat Petroleum Corporation Ltd (BPCL), RINL, and Pawan Hans.

8. Which CPSEs are likely to see disinvestment?

- The center is not going to add new companies to the list of CPSEs to be divested in 2023-24 and the aspirational divestment of two public sector banks and one general insurance firm announced in the budget two years ago, will also not be a part of the plan.
- According to DIPAM, the government has decided to stick to the already-announced and planned privatization of state-owned companies.
- Incidentally, the disinvestment of Bharat Petroleum Corporation Limited, SCI, and ConCor had been approved by the government in 2019 but has not gone through yet.

Mains Corner

1.What is Article 105 of the Indian Constitution and discuss its provisions and how does it protect MPs? (250 Words)

2. How the treaty of alinagar set the stage for the English East India Company political rise (250 Words)

3. **Discuss Vijayanagar's contributions to culture and architecture and Why it is the last bastion of Hindu rule in the South. (250 Words)**

4. What are Primary Agricultural Credit Societies and discuss their role in capital access to farmers? (250 Words)

5. What is Joint Parliamentary Committee and discuss its powers and functions. (250 Words)

Prelims corner

1. With reference to Paris Club, consider the following countries:

1) Australia

2) Canada
3) India
4) Russia
5) China
6) Israel
Which of the above countries are the members of Paris Club?
A) 1, 2, 3, 4 and 5 only
B) 1, 2, 4 and 6 only
C) 2, 4, 5 and 6 only
D) 1, 2, 3, 4, 5 and 6
2. Additional surveillance mechanism (ASM) seen in news relates to:
A) Defense and Security
B) Artificial Intelligence and Cyber Security
C) Share prices and Market volatility
D) Space debris mechanism

3. With reference to 'Green Deal Industrial Plan', consider the following statements:
1) Unveiled by United States it aims to expand its green industry, cut red tape and provide massive subsidies in the trade sector.
2) It counters European Union's Inflation Reduction Act (IRA).
Which of the above statements are correct?
A) Only 1 B) Only 2 C) Both 1 and 2 D) Neither 1 nor 2

4. With reference to President's address to Parliament, consider the following statements:
1. In India, the practice of the President addressing Parliament was established after the promulgation of the Government of India Act in 1919.

2. Article 87 provides two special occasions on which the President addresses a joint sitting.
3. In 1951, the First Amendment to the Constitution made the President's address an annual affair.
Which of the above statements are correct?
A) Only 1 B) 2 and 3 only C) 1, 2 and 3 D) None of the above

5. Seen sometimes in news "Apoptosis" is the process related to
A) Cell biology
B) Archaeology
C) Quantum Physics
D) Micro Economics

Prelims Key

1	2	3	4	5
B	C	D	C	A