NIRVANA IAS ACADEMY

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EXPLAINED

CONTENTS

ONE NATION ONE FASTAG SCHEME

Minister of Road Transport and Highways inaugurated the "One Nation One FASTag" scheme at the Indian Mobile Congress in New Delhi.

The plan aims to integrate the collection of toll digitally and ensure seamless mobility of vehicles across India.

The scheme will be implemented from December 1, 2019, and can be availed upon activation by new cars having Radio Frequency Identification (RFID) tags on national and state highways throughout the country.

'ONE NATION ONE FASTAG' SCHEME

The existing FASTags under various jurisdictions of states and agencies would be enabled under this scheme, thus integrating the collection of toll digitally so that seamless services can be provided to consumers all over India.

The move is significant given that the Centre has decided that from December 1, all national highway toll plazas will accept tolls only through FASTags.

FASTAGS

- FASTags are stickers that are affixed to the windscreen of vehicles and use RFID technology to enable digital, contactless payment of tolls without having to stop at toll gates.
- The tags are linked to bank accounts and other payment methods.

- The tag is valid for five years and comes in seven different colours — violet, orange, yellow, green, pink, blue, black. Each colour is assigned to a particular category of vehicles.
- It was rolled out in April 2016 and the Government made it mandatory from December 1, 2017 for all new cars and trucks to be fitted with a FASTag before they were sold.
- To encourage the use of FASTags, the National Highway Authority of India (NHAI) refunds 5% of the total monthly transactions.
- Indian Highways Management Company Limited (IHMCL) (a company incorporated by National Highways Authority of India) and National Payment Corporation of India (NPCI) are implementing this program.
- FASTag is presently operational at both, national and state highways.

- As a car crosses a toll plaza, the amount is automatically deducted, and a notification is sent to the registered mobile phone number. Sensors are placed on toll barriers, and the barriers open for vehicles having valid FASTags.
- A FASTag is valid for five years and needs to be recharged only as per requirement.
- According to the National Highways Authority of India (NHAI), these devices will make passing through tolls considerably smoother since drivers will no longer have to carry cash or stop to make a transaction.

EMISSION TRADING SCHEME

After failing to check air pollution through the usual enforcement methods, the Union Ministry of Environment and Forests (MoEF) has introduced a market-based mechanism to reduce air pollution. It is called the Emissions Trading Scheme (ETS).

Nobel Laureates Abhijit Banerjee and Esther Duflo's Abdul Latif Jameel Poverty Action Lab (J-PAL) is one of the primary agencies working on a novel Emission Trading Scheme (ETS) — the first of its kind in the world — which was launched a month ago in Surat, Gujarat.

The ministry has initiated a pilot ETS in industrial areas of three states—**Gujarat, Maharashtra and Tamil Nadu**—with the aim of improving overall ambient air quality.

HIGHLIGHTS

- These states were chosen because they have maximum number of industries and critically polluted areas.
- The scheme allows the regulators—Central and state pollution control boards—to set a cap on the aggregate level of pollution permitted in an industrial area, and then allows the industries to self-regulate to ensure that pollution does not exceed this cap.
- Industries that emit excess pollutants can buy points from industries that overachieve targets just like in the carbon trading system.
- The Emissions Trading Scheme proposed by MoEF for particulate matter would be the first of its kind in the world.
- The scheme is in its nascent stage and the results of pilot study would be used to determine its feasibility in other parts of the country.

- For example, the CDM (carbon development mechanism) under the Kyoto Protocol allows trade in 'carbon credits'; the European Union's Emission Trading System is for greenhouse gas emission; and India has a scheme run by the **Bureau of Energy Efficiency** that enables trading in energy units.

HOW THE SCHEME WORKS

- The scheme comes at a time when compliance with the National Ambient Air Quality Standards (NAAQS) that came into force in 2009 has proved to be abysmal across the country.
- The mean ambient concentration of particulates in India is much higher than the prescribed norms and is about five times that of the United States. Keeping this in mind the regulatory bodies are targeting particulate matter emissions under ETS.
- The scheme allows the regulator to set an overall emission level for a sector and allocate these emissions among units in the form of permits. At the end of each permit period, regulators can check emissions against permit holdings to verify compliance.

J-PAL

- J-PAL is a network of affiliated professors working on poverty alleviation with their headquarters in the economics department of Massachusetts Institute of Technology (MIT). The pilot project is a two-part exercise.
  1) The first part involves the testing of continuous emissions monitoring systems or CEMS (continuous emissions monitoring system'), which would provide real time data on industrial pollution to regulators.
  2) Part two proposes using the data generated as the basis for a market-based regulatory programme.
- Emissions trading would encourage compliance and push industries to pursue cost effective reduction strategies besides providing incentives to develop means by which emissions can be reduced, claim the consultants.

FRAMEWORK OF EMISSION TRADING SCHEME
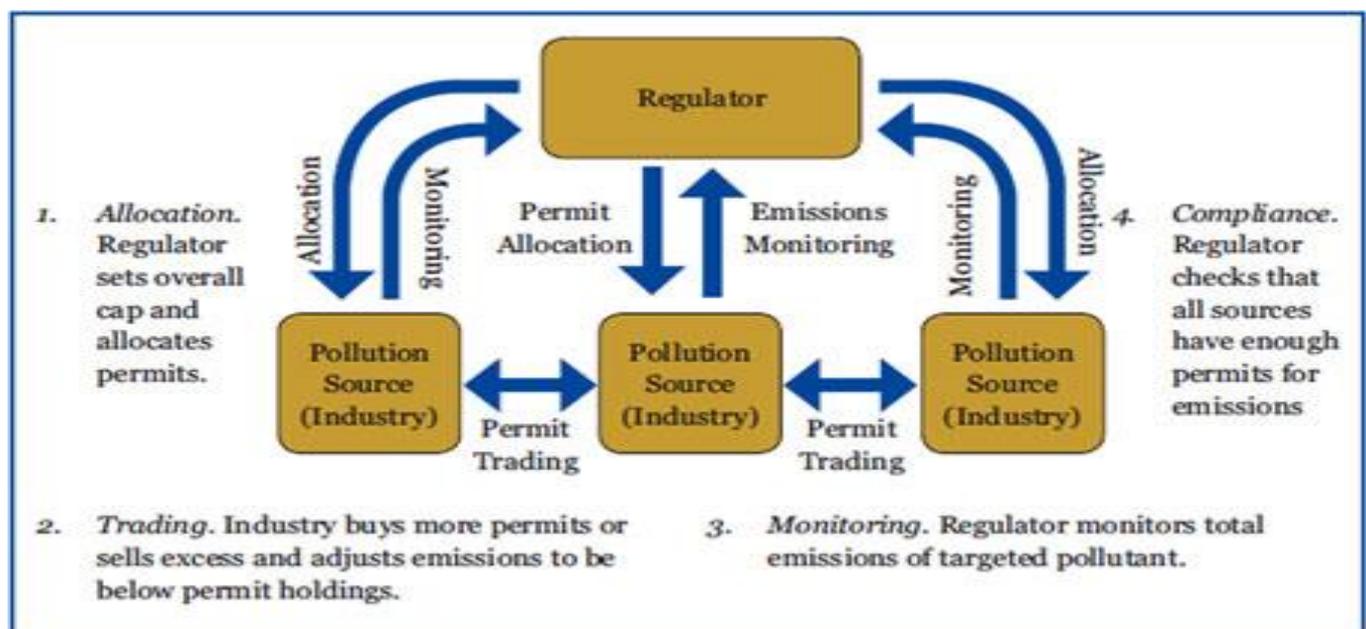
- ETS will bring emissions below the prescribed norms. The system however demands efforts from both the regulatory bodies in terms of setting standards and industries in terms of compliance to the set standards.
- The system is a shift from the traditional command-and-control approach used in the country to reduce pollution.
- There is no law in the country which allows regulators to charge the industries for emissions. But state pollution control boards can discipline polluters by revoking the consents for them to operate.

WHAT IS THE GUJARAT SCHEME SUPPORTED BY J-PAL?

- The Emissions Trading Scheme (ETS) is a regulatory tool aimed at reducing the pollution load in an area, and at the same time minimising the cost of compliance for the industry.
- ETS is a market in which the traded commodity is particulate matter emissions.
- The Gujarat Pollution Control Board (GPCB) sets a cap on the total emission load from all industries.

- Various industries can buy and sell the ability to emit particulate matter, by trading permits (in kilograms) under this cap. For this reason, ETS is also called a cap-and-trade market.

The Tamil Nadu Pollution Control Board (TNPCB) is the first board in the country to set up a continuous emission monitoring station called the CARE Air Centre.

CONCERNS

- One complication in linking NAAQS and ambient air quality to the cap is that the former refers to the total level of pollutants in an area, which is a function of all local sources (of which industry is a fraction and transport and others play a significant role) as well as more distant sources whose pollutants are transmitted through meteorological forces.
- A simpler method for the pilot might, therefore, be to rely on estimating how much industries covered by the pilot are currently contributing and then setting a target below that.
- Particulate matter (PM) is a diffused parameter with a very complex profile. ETS for particulate matter would involve number of uncertainties and requires a lot of objectivity in its approach.
- Introducing cap and trade for particulate emissions would need a lot of source profiling, direct PM control measures and enormous sophisticated technologies for monitoring and reporting.
- ETS for PM can be made possible only with a stringent monitoring and reporting system at each stack level and if load-based standards are introduced in the industries. However, such infrastructural and technological changes would be feasible only for large-scale industries and will be difficult for smaller industries to implement.
- ETS, also referred to as **PAT (perform, achieve and trade) scheme**, is being tested in several industrial belts.

LOK SABHA

Former Union Minister and Congress leader Jitin Prasada said the number of Lok Sabha seats should be rationalised on the basis of population. The composition of the Lower House has remained more or less the same for four decades.

STRENGTH OF LOK SABHA

- **Article 81 of the Constitution** defines the composition of the House of the People or Lok Sabha. It states that the House shall not consist of more than 550 elected members of whom not more than 20 will represent Union Territories.
- Under **Article 331**, the President can nominate up to two Anglo-Indians if he/she feels the community is inadequately represented in the House. At present, the strength of the Lok Sabha is 543, of which 530 have been allocated to the states and the rest to the Union Territories.
- **Article 81** also mandates that the number of Lok Sabha seats allotted to a state would be such that the ratio between that number and the population of the state is, as far as possible, the same for all states. This is to ensure that every state is equally represented.   However, this logic does not apply to small states whose population is not more than 60 lakh. So, at least one seat is allocated to every state even if it means that its population-to-seat-ratio is not enough to qualify it for that seat.
- As per **Clause 3 of Article 81**, population, for the purpose of allocation of seats, means "population as ascertained at the last preceding census of which the relevant figures have been published". In other words, the last published Census. But, by an amendment to this Clause in 2003, the population now means population as per the 1971 Census, until the first Census taken after 2026.

BACKGROUND

The strength of the Lok Sabha hasn't always been 543 seats.

- Originally, Article 81 provided that the Lok Sabha shall not have more than 500 members. The first House constituted in 1952 had 497. Since the Constitution provides for population as the basis of determining allocation of seats, the lower House's composition (total seats as well as readjustment of seats allocated to different states) has also changed with each Census up to 1971.

A temporary freeze was imposed in 1976 on 'Delimitation' until 2001. *Delimitation is the process of redrawing boundaries of Lok Sabha and state Assembly seats to represent changes in the population.*

- The first major change took place after the overall reorganisation of states in 1956, which divided the country into 14 states and six Union Territories. This meant subsequent changes in the boundaries of existing states and hence, a change in the allocation of seats to the states and Union Territories.
- So, with reorganisation, the government also amended the Constitution by which the maximum number of seats allocated to the states remained 500, but an additional 20 seats (also maximum limit) were added to represent the six Union Territories.
- So, the second Lok Sabha elected in 1957 had 503 members. Further down the years, the lower House's composition also changed when the state of Haryana was carved out of Punjab in 1966 and when Goa and Daman and Diu were liberated in 1961 and merged with the Indian Union subsequently.

As per Article 81, the composition of the Lok Sabha should represent changes in population. But it has remained more or less the same since the delimitation carried out based on the 1971 Census. Why is it so?

- The population-to-seat ratio, as mandated under Article 81, should be the same for all states. Although unintended, this implied that states that took little interest in population control could end up with a greater number of seats in Parliament.
- The southern states that promoted family planning faced the possibility of having their seats reduced. To allay these fears, the Constitution was amended during Indira Gandhi's Emergency rule in 1976 to suspend delimitation until 2001.
- There have been a few occasions which have called for **readjustment in the number of Parliament and Assembly seats allocated to a state**. These include statehood attained by Arunachal Pradesh and Mizoram in 1986, the creation of a Legislative Assembly for the National Capital Territory of Delhi, and creation of new states such as Uttarakhand.
- Although the freeze on the number of seats in Lok Sabha and Assemblies should have been lifted after the Census of 2001, another amendment postponed this until 2026. This was justified on the ground that a uniform population growth rate would be achieved throughout the country by 2026.
- So, the last delimitation exercise – started in July 2002 and finished on May 31, 2008 – was conducted on the basis of the 2001 Census and only readjusted boundaries of existing Lok Sabha and Assembly seats and reworked the number of seats reserved for SCs and STs.

With the total seats remaining the same since the 1970s, it is felt that states in north India, whose population has increased faster than the rest of the country, are now underrepresented in the Parliament. It is frequently argued that had the original provision of Article 81 been implemented today, then states like Uttar Pradesh, Bihar and Madhya Pradesh would have gained seats and those in the south would have lost some.

GOLDEN RATIO

For centuries, the golden ratio has fascinated all kinds of people, not just mathematicians. Physicists and biologists have studied it, architects and artists have used it, and worshippers have described it as a divine design. And through the centuries, the golden ratio has continued to amaze its diverse fans, frequently cropping up at unexpected places.

The latest such place is the human skull. If we draw an arc across the top of the skull and divide it at a key junction over the brain, the two arc-segments are approximately in the golden ratio. This feature was studied recently by researchers of Johns Hopkins University, US.

HIGHLIGHTS

- The golden ratio can be defined in terms of a line, divided into two unequal segments in a way that their lengths meet a simple condition.
- When the ratio between these two lengths (the longer segment divided by the shorter one) happens to be the same as the ratio between the entire line and the longer segment, then the line is said to be divided in the golden ratio (see illustration).
- For this condition to hold good, the ratio needs to be 1.61803… with the digits after the decimal going on forever; the golden ratio is what we call an "irrational number". It is represented by the **Greek letter phi.**

WHY SHOULD SUCH A RATIO BE CONSIDERED SPECIAL?

- Aesthetic appeal is among the first of many reasons. Architects such as Le Corbusier have consciously proportioned their works to the golden ratio, or close. So have artists such as Salvador Dalí and Leonardo da Vinci, whose fascination with the golden ratio features in the novel The Da Vinci Code and the film based on it.

- Interpretations of the golden ratio have not always been objective. Some have related it to their idea of aesthetic beauty in facial proportions, using the golden ratio to describe Audrey Hepburn's face as perfection, and Marilyn Monroe's as close.

- The fact remains, however, that the golden ratio frequently shows itself in nature, whether directly or indirectly (through its cousins called the Fibonacci numbers). *To cite a few examples, the golden ratio appears in the seeds of sunflowers, the scales of pineapples, the arrangement of petals on a rose, DNA structures, the anatomy of the heart — and has now turned up in the human skull.*

THE NEWEST APPEARANCE

- In the days before computerised scans became the norm, neurosurgeons would themselves carry out measurements on the skulls of their patients. One such measurement is the distance from the base of the nose (nasion) to the bump at the back of the head (inion).
- At a junction called the bregma, which is the meeting point of two important connective tissue joints, the arc was divided into two sub-arcs that respectively accounted for 61.8% and 38.2% of the total arc length.

ONLY IN HUMANS

- For comparison, scientists carried out the same measurements in 70 skulls of six other mammals, this time, the division was not in the golden ratio of 1.61.
- Yet a trend appeared to emerge here too. The closest to the golden ratio was found in the skulls of lions (measured ratio 1.74), followed by tigers (1.77), before deviating further and further for rhesus monkeys (1.86), domestic dogs (1.91), blue monkeys (1.95) and finally eastern cottontail rabbits, in whose skulls the ratio was a distant 2.25.
- In the limited sampling, it appeared that the more sophisticated the mammal, the closer the measured ratio was to the golden ratio. It is unclear, the research paper said, why the golden ratio emerges in the human skull and not in those of lower mammals.
- The golden ratio is alternatively called the golden mean and the divine ratio. Its frequent appearances in nature have driven claims that it is the work of a divine design.

INDEX OF INDUSTRIAL PRODUCTION (IIP)

According to the data for the "Quick Estimates of Index of Industrial Production" released by the Ministry of Statistics and Programme Implementation (MoSPI), India's industrial sector production contracted by 1.1 per cent in August when compared to the production in the same month in 2018.

As far as such year-on-year comparisons go, the last time a reduction in the IIP happened was in June 2017. But this time, the fall was sharper — the index has fallen to an 81-month low, leading back to November 2012.

WHICH SECTORS ARE LAGGING IN PRODUCTION?

There are two ways in which IIP data can be viewed. The first is to look at sectoral performance.

- In this the whole industrial economy is divided into three sectors;
  a) The first is manufacturing with a weight of 77.6 per cent in the index.
  b) The second is mining with a weight of 14.4 per cent.
  c) Third is electricity with a weight of 8 per cent.
- The second way to look at the same production is to look at the way such industrial products are used; this is called the **use-based classification.**

HOW USEFUL ARE MONTHLY IIP FIGURES TO DRAW A CONCLUSION ABOUT INDIA'S GROWTH?

- IIP figures are monthly data and as such it keeps going up and down. In fact, the release calls them "**quick estimates**" because they tend to get revised after a month or two.
- As such, it is true that one should not take just one month's IIP data and project it for the whole year or indeed use it to conclude that the full year's economic growth will be low.

IIP

- As the name suggests, the Index of Industrial Production (IIP) maps the change in the volume of production in Indian industries.
- More formally, it chooses a basket of industrial products — ranging from the manufacturing sector to mining to energy, creates an index by giving different weight to each sector and then tracks the production every month.
- Finally, the index value is compared to the value it had in the same month last year to figure out the economy's industrial health.
- The Index of Industrial Production (IIP) is an index for India which details out the growth of various sectors in an economy such as mineral mining, electricity and manufacturing.
- The all India IIP is a composite indicator that measures the short-term changes in the volume of production of a basket of industrial products during a given period with respect to that in a chosen base period.
- It is compiled and published monthly by the National statistical Office (NSO), Ministry of Statistics and Programme Implementation six weeks after the reference month ends.
- The level of the Index of Industrial Production (IIP) is an abstract number, the magnitude of which represents the status of production in the industrial sector for a given period of time as compared to a reference period of time.
- The base year was at one time fixed at 1993–94 so that year was assigned an index level of 100. The current base year is 2011-2012.
- The Eight Core Industries comprise nearly 40.27% of the weight of items included in the Index of Industrial Production (IIP). These are **ELECTRICITY, STEEL, REFINERY PRODUCTS, CRUDE OIL, COAL, CEMENT, NATURAL GAS** and **FERTILISERS**.

ALEXEI LEONOV

Russian cosmonaut Alexei Leonov, the first human to ever walk in space died at the age of 85 in Moscow.

On March 18, 1965, Leonov created history after he exited the Voskhod 2 spacecraft capsule, tethered by a 16 feet long cable, and floated in space for a duration of 12 minutes and 9 seconds.

VOSKHOD 2 MISSION

- In the 1960s, Leonov was amongst the 20 Soviet Air Force pilots chosen to be a part of the first cosmonaut training group.
- His walk-in space was originally planned to have been part of the first mission of the Voskhod series, but it was later shifted to the Voskhod 2 spacecraft instead.
- The mission came four years after Yuri Gagarin became the first human to ever journey into space, a major milestone in the space race between the US and the Soviets.

- The Voskhod 2 spacecraft, with a capacity of carrying two cosmonauts, had an extended inflatable airlock name '**Volga**', which was detachable.
- The spacecraft took off on March 18, 1965.

GRAMEEN BANK

A labour court in Dhaka this week issued a warrant of arrest against the Nobel Prize-winning Bangladeshi economist Muhammad Yunus after he failed to appear at a hearing over the sacking of three workers at Grameen Communications, which is the IT wing of Grameen Bank, the organisation Yunus founded in 1983.

Yunus was awarded the Nobel Peace Prize along with the Grameen Bank in 2006 for their contribution "to create economic and social development from below".

WHAT DOES YUNUS'S GRAMEEN BANK DO?

- Yunus founded the Grameen Bank on the principles of "trust and solidarity" to provide micro-credit without collateral to the "poorest of the poor" in rural Bangladesh.
- According to its website, the bank provides services in over 80,000 villages and has about 2,500 branches.
- The Norwegian Nobel Committee recognised the efforts of Yunus and Grameen Bank "*to create economic and social development from below". The citation noted that "lasting peace cannot be achieved unless large population groups find ways in which to break out of poverty. Micro-credit is one such means. Development from below also serves to advance democracy and human rights."*

NATIONAL PROGRAMME FOR CONTROL OF BLINDNESS

- National Programme for Control of Blindness was launched in the year 1976 as a 100% Centrally Sponsored scheme with the goal to reduce the prevalence of blindness from 1.4% to 0.3%.
- As per Survey in 2001-02, prevalence of blindness is estimated to be 1.1%.
- Rapid Survey on Avoidable Blindness conducted under NPCB during 2006-07 showed reduction in the prevalence of blindness from 1.1% (2001-02) to 1% (2006-07).
- Various activities/initiatives undertaken during the Five Year Plans under NPCB are targeted towards achieving the goal of reducing the prevalence of blindness to 0.3% by the year 2020.

GOALS

- To reduce the prevalence of blindness (1.49% in 1986-89) to less than 0.3%
- To establish an infrastructure and efficiency levels in the programme to be able to cater new cases of blindness each year to prevent future backlog.

OBJECTIVES

- To reduce the backlog of blindness through identification and treatment of blind at primary, secondary and tertiary levels based on assessment of the overall burden of visual impairment in the country.
- Develop and strengthen the strategy of NPCB for "Eye Health" and prevention of visual impairment; through provision of comprehensive eye care services and quality service delivery.
- Strengthening and up gradation of RIOS to become centre of excellence in various sub-specialties of ophthalmology.
- Strengthening the existing and developing additional human resources and infrastructure facilities for providing high quality comprehensive Eye Care in all Districts of the country.
- To enhance community awareness on eye care and lay stress on preventive measures.
- Increase and expand research for prevention of blindness and visual impairment.
- To secure participation of Voluntary Organizations/Private Practitioners in eye Care.

COALITION FOR DISASTER RESILIENT INFRASTRUCTURE

While speaking at the UN Secretary General's Climate Action Summit in New York on September 23, Prime Minister of India had announced the launch of the Coalition for Disaster Resilient Infrastructure (CDRI) and invited all countries to join it.

HIGHLIGHTS

- CDRI is an attempt to bring countries together to share and learn from the experiences of one another to protect their key infrastructure — highways, railways, power stations, communication lines, water channels, even housing — against disasters.
- The platform is not meant to plan or execute infrastructure projects. Nor is it an agency that will finance infrastructure projects in member countries. Instead, CDRI will seek to identify and promote best practices, provide access to capacity building, and work towards standardisation of designs, processes and regulations relating to infrastructure creation and management.
- It would also attempt to identify and estimate the risks to, and from, large infrastructure in the event of different kinds of disasters in member countries.
- CDRI hopes to have as its members not just countries, but organisations like UN bodies, financial institutions, and other groups working on disaster management.
- It seeks to help member countries integrate disaster management policies in all their activities, set up institutions and regulatory provisions to ensure creation of resilient infrastructure, and identify and use affordable finance and technology.

CDRI AND BELT ROAD INITIATIVE

CDRI has sometimes been seen as India's response to the Belt Road Initiative, China's ongoing multi-billion-dollar programme to recreate the ancient Silk Route trading links. China is building massive new land and maritime infrastructure in several countries. India and some other nations view this as an attempt by China to use its economic and military heft to usurp strategic assets in other countries.

CDRI AND SOLAR ALLIANCE

A more relevant comparison of CDRI can, however, be made with the International Solar Alliance (ISA) that India launched at the climate meeting in Paris in 2015. ISA, which has evolved into a treaty-based organisation with more than 50 countries already signed up, aims at a collective effort to promote the deployment of solar energy across the world. Its objective is to mobilise more than $1 trillion into solar power by 2030, and to deploy over 1,000 GW of solar generation capacity in member countries by that time. India hosts ISA, with its headquarters in Gurgaon.

- The **CDRI secretariat too would be based in New Delhi.**
- While it is not envisioned to take the shape of a treaty-based organisation, CDRI can be seen as complementing ISA's efforts.
- ISA is about climate change mitigation — deployment of more solar energy would bring down the reliance on fossil fuels, thereby reducing greenhouse gas emissions. CDRI, on the other hand, is about adapting to climate change, a need that is inevitable.

ELASTOCALORIC EFFECT

When rubbers bands are twisted and untwisted, it produces a cooling effect. This is called the "elastocaloric" effect, and researchers have suggested that it can be used in a very relevant context today.

HIGHLIGHTS

Researchers from multiple universities, including Nankai University in China, have found that the elastocaloric effect, if harnessed, may be able to do away with the need of fluid refrigerants used in fridges and air-conditioners. These fluids are susceptible to leakages, and can contribute to global warming.

- In the elastocaloric effect, the transfer of heat works much the same way as when fluid refrigerants are compressed and expanded.
- When a rubber band is stretched, it absorbs heat from its environment, and when it is released, it gradually cools down.
- In order to figure out how the twisting mechanism might be able to enable a fridge, the researchers compared the cooling power of rubber fibres, nylon and polyethylene fishing lines and nickel-titanium wires. *They observed high cooling from twist changes in twisted, coiled and supercoiled fibres.*

- The level of efficiency of the heat exchange in rubber bands "is comparable to that of standard refrigerants and twice as high as stretching the same materials without twisting".

INDIA CHINA INFORMAL SUMMIT

Prime Minister of India and Chinese President met in the ancient coastal town of Mamallapuram or Mahabalipuram in Tamil Nadu, some 50 kilometres south of Chennai, for a second Informal Summit on October 11-12.

The two countries convened their first Informal Summit in central China's Wuhan in April 2018, where they exchanged views on issues of global and bilateral significance.

HIGHLIGHTS

- Informal Summits act as supplementary exchanges to annual Summits and other formal exchanges such as the G20 Summit, EU-India Summit and the BRICS Summit among others, and allow for "direct, free and candid exchange of views" between countries, something that may not be possible to do through formal bilateral and multilateral meetings that are agenda driven, where specific issues are discussed, and outcomes are more concretely defined.
- Informal Summits may not take place on a fixed annual or biennial schedule; they are impromptu in the sense that they take place when a need for them is perceived by the concerned nations. (For instance, the intergovernmental organisation ASEAN held four Informal Summits in the years 1996, 1997, 1999, and 2000. And in November 2018, Prime Minister Narendra Modi attended the ASEAN-India Informal Breakfast Summit in Singapore).
- Since Informal Summits allow discussion on wide-ranging issues, they are not particularly purpose-specific, and are sometimes considered to play bigger roles in diplomatic dialogue than formal exchanges — the reason is that they tend to be more in-depth, and relatively flexible in intent and the scope of discussion.
- *For instance, in Wuhan, Prime Minister Modi and President Xi discussed a range of subjects, including the India-China boundary question, bilateral trade and investment, terrorism, economic development and global peace, and reached a "broad consensus".*

BACKGROUND

- China is not the only country with which India has had an Informal Summit. In May 2018, Modi met Russia's President Vladimir Putin for their first Informal Summit in Russia's Sochi to discuss international matters in a "broad and long-term perspective".
- In June 2019, on the sidelines of the G20 Summit, Russia, India and China convened together for the "Russia-India-China (RIC) Informal Summit" where they discussed issues related to the economic, security and political situation of the world.

WUHAN INFORMAL SUMMIT

- At the first Informal Summit between India and China held in Wuhan on April 27-18, 2018, Modi and Xi met "to exchange views on overarching issues of bilateral and global importance, and to elaborate their respective visions and priorities for national development in the context of the current and future international situation".
- The Wuhan Summit achieved a **"re-set"** of the Sino-Indian relationship after the two-month long border standoff at the **India-China-Bhutan trijunction in Doklam.** Significantly, at Wuhan, the two leaders decided to give "strategic guidance" to their military, so that issues did not escalate as in the case of the Doklam standoff.
- **Japan and Russia are the only two countries with which India has annual Summits at present.**
- Wuhan Summit stated that China and India should be "good neighbours and good friends". It also emphasised the need to carry out "in-depth practical cooperation" and promote people and cultural exchanges "in a more mature manner".

MAMALLAPURAM

- The name Mamallapuram derives from Mamallan, or "great warrior", a title by which the Pallava King Narasimhavarman I (630-668 AD) was known.
- It was during his reign that Hiuen Tsang, the Chinese Buddhist monk-traveller, visited the Pallava capital at Kanchipuram.

- Narasimhavarman II (c.700-728 AD), also known as Rajasimhan, built on the work of earlier Pallava kings to consolidate maritime mercantile links with southeast Asia.
- Most interestingly, as historian Tansen Sen recorded in his 2003 work Buddhism, Diplomacy and Trade: The Realignment of Sino-Indian Relations, 600-1400, Narasimhavarman II sent a mission to the Tang court in 720 with a request that would seem unusual in the context of India-China relations today.
- The emissaries of the Pallava king sought the permission of Emperor Xuangzong to fight back Arab and Tibetan intrusions in South Asia. And, "Pleased with the Indian king's offer to form a coalition against the Arabs and Tibetans, the Chinese emperor bestowed the title of 'huaide jun' (the Army that Cherishes Virtue) to Narayansimha II's troops".
- The offer of help by the Pallava ruler, Sen noted, may have had more to do with furthering trade and for the prestige of association with the Chinese emperor, rather than any real prospect of helping him to fight off enemies in the faraway north.
- The Descent of the Ganga/Arjuna's Penance, a rock carving commissioned by Narasimhavarman I, with its depiction of the Bhagirathi flowing from the Himalayas, may serve as a reminder of the geography of India-China relations, and their shared resources.

HINDUS, MUSLIMS AND CHINA

- Tamil-Chinese links continued after the Pallavas, flourishing under the Cholas as the Coromandel coast became the entrepot between China and the Middle East.
- The links extended to a wider area beyond Mahabalipuram, through a layered history that has left a rich tapestry of society, culture, art and architecture, which is diverse and complex, and reaches up to modern times.
- If he looks south from the platform of the 7th century Shore Temple, President Xi might be able to spot a key symbol of 20th century — the white domes of the Madras Atomic Power Station at Kalpakkam, 15 km down the coastline.
- MAPS, built in the 1980s, is India's first indigenously constructed power station.
- By the time Islam arrived on south India's east coast in the 9th century, Muslims had already started trading with China by maritime routes.
- The trading missions that the Cholas sent to the Song court included Muslims.
- A trader named Abu Qasim was second-in-command of a mission sent in 1015; the next mission, in 1033, included one Abu Adil.
- It is possible that both Abu Qasim and Abu Adil were members of the Tamil-speaking Muslim community on the Coromandel coastknown as Ilappai,
- Today, the ancient port of Marakanam is a fishing village, known for its **Muslim boatmakers.**

RCEP

Commerce Minister was in Bangkok for the eighth Regional Comprehensive Economic Partnership (RCEP) ministerial meeting, which continued until October 12.

RCEP

- The Regional Comprehensive Economic Partnership (RCEP) is a trade deal that is currently under negotiation among 16 countries — the 10 member countries of the Association of Southeast Asian Nations (ASEAN), and the six countries with which the ASEAN bloc has free trade agreements (FTA).
- The ASEAN, which includes Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Vietnam, has FTAs with India, Australia, China, South Korea, Japan and New Zealand.
- Negotiations on the details of the RCEP have been on since 2013, and all participating countries aim to finalise and sign the deal by November.

RCEP MANDATE

- The purpose of RCEP is to create an "integrated market" spanning all 16 countries, making it easier for products and services of each of these countries to be available across this region.
- ASEAN says the deal will provide "a framework aimed at lowering trade barriers and securing improved market access for goods and services for businesses in the region".

- The negotiations are focussed on areas like trade in goods and services, investment, economic and technical cooperation, intellectual property, competition, dispute settlement, e-commerce, and small and medium enterprises.

SIGNIFICANCE

- It is billed as the "largest" regional trading agreement ever — these countries account for almost half of the world's population, contribute over a quarter of world exports, and make up around 30% of global Gross Domestic Product (the value of all goods and services produced in a year).
- Sections of Indian industry feel that being part of RCEP would allow the country to tap into a huge market, if the domestic industry becomes competitive. Pharmaceuticals and cotton yarn are confident of gains, and the services industry too, may have new opportunities.

CONCERNS

- Several industries feel India needs to be mindful of the amount of access it gives to its market. There is fear that some domestic sectors may be hit by cheaper alternatives from other RCEP countries. Apprehensions have been expressed that cheaper Chinese products would "flood" India.
- Critics are also not confident that India would be able to take advantage of the deal, given its poor track record of extracting benefits from the FTAs with these countries.
- India's trade gap with these countries may widen if it signs the RCEP deal.
- Industries like dairy and steel have demanded protection. The textile industry, which has already raised concerns about growing competition from neighbouring countries with cheaper and more efficient processes, fears the deal would impact it negatively.
- There are some differences within industries. The bigger players in steel, for example, are apprehensive of the potential impact on their businesses; however, makers of finished goods have argued that limiting steel supply to domestic producers through higher import duties will put them at a disadvantage.

GLOBAL COMPETITIVENESS INDEX

The latest edition of the Global Competitiveness Report, which was first launched in 1979, ranks India at 68th position among 141 countries – that's 10 ranks below its 2018 position in the same index.

GCI

- This is the fourth version of the global competitiveness index – hence referred to as GCI 4.0 – and it was introduced in 2018. The 141 countries mapped by this year's GCI account for 99 per cent of the world's GDP.
- The basic notion behind the GCI is to map the factors that determine the **Total Factor Productivity (TFP)** in a country.
- The TFP is essentially the efficiency with which different factors of production such as **land, labour and capital** are put to use to create the final product.
- It is believed that it is the TFP in an economy that determines the long-term economic growth of a country.

WHAT FACTORS DOES GCI MAP?

- According to the report, the **GCI 4.0** is "the product of an aggregation of 103 individual indicators, derived from a combination of data from international organizations as well as from the **World Economic Forum's Executive Opinion Survey".**
- The GCI 4.0 tracks data and/or responses on 12 factors divided into 4 broad categories.
  1. The first category is the "Enabling Environment" and this includes factors such as the state of infrastructure, institutions, the macroeconomic stability of the country and its ability to adopt new technology.
  2. The second category is "Human Capital" and includes health and level of skills in the economy.
  3. The third is the state of "Markets" such as those for labour, product, financial and the overall market size.
  4. The last category is "Innovation Ecosystem" which includes business dynamism and innovation capability.

HOW ARE COUNTRIES RANKED?

- According to the report, "a country's performance on the overall GCI results as well as each of its components is reported as a 'progress score' on a 0-to-100 scale, where 100 represents the 'frontier', an ideal state where an issue ceases to be a constraint to productivity growth". For example, the average GCI score across the 141 economies that were studied this year was 60.7. This means that the 'distance to the frontier' stands at almost 40 points.

C40 WORLD MAYORS' SUMMIT

Delhi Chief Minister Arvind Kejriwal called off his visit to Copenhagen to attend the C40 World Mayors' Summit after he failed to receive the mandatory clearance from the Ministry of External Affairs (MEA).

The C40 summit held in Denmark's capital, and attendees include mayors representing over 90 cities from around the world. United States Congresswoman Alexandria Ocasio-Cortez is also in Copenhagen for the event.

- The host city of this year's conference (scheduled to last from October 9 to October 12) Copenhagen, plans to become carbon neutral by 2025.
- C40 Summits are known for publishing important research, showcasing innovations by cities, and for forging global partnerships.
- At the 2019 Summit, the Mayor of Los Angeles will take over as chair of the group.
- The cities from India that are part of the C40 are Delhi NCR, Bengaluru, Jaipur, and Kolkata.

HIGHLIGHTS

- The C40 World Mayors' Summit is a three-day conference where city leaders from around the world share ideas on green urban development, and on ways to get national governments to act on climate issues.
- The C40 connects more than 96 of the world's largest cities to deliver urgent and essential climate action needed to secure a sustainable future for urban citizens worldwide.
- The group is committed to delivering on climate targets set under the 2016 Paris Agreement, and sets the bar for cities to develop and implement local level plans that comply with those targets.
- The C40 group was started in 2005 by the then Mayor of London, Ken Livingstone, and got its name in 2006, since it had 40 members that year.
- It has 96 members at present, representing over 70 crore people, and one-quarter of the global economy.
- Cities, according to the C40 website, have the potential to deliver 40 per cent of the emissions reductions to meet the Paris targets.
- Analysts believe that cities are better equipped to deal at climate negotiations than nations, since the former do not have to deal with issues such as borders and sovereignty.

LAWFUL INTERCEPTION

Telecom Regulatory Authority of India (TRAI) is studying the possibility of bringing platforms such as WhatsApp under the ambit of "lawful interception".

- Lawful interception of online communications platforms such as WhatsApp, Skype, Signal or Telegram has been a long-running debate that has ranged governments and regulators across the world against technology companies and privacy activists.
- The authorities want such platforms to provide access to messages, calls, and their logs to law-enforcement agencies to aid them with investigations. India, too, has made demands for traceability of communications from instant messaging platforms.

WHY IS TRAI LOOKING AT LAWFUL INTERCEPTION OF ONLINE MESSAGING APPS?

- The telecom sector watchdog has been carrying out consultations to build a regulatory framework for **over-the-top service providers (OTTs)** — or platforms that use the infrastructure of traditional telecom companies like the Internet to offer their services.
- TRAI has been looking at the regulation of OTTs since 2015, when mobile companies first raised concerns over services such as WhatsApp and Skype causing loss of revenues by offering free messaging and call services.
- The other argument made at the time was that these services do not fall under the licensing regime prescribed by The Indian Telegraph Act, 1885, and effectively operated in a regulatory dark spot.

- Over time, TRAI looked at various aspects of the lack of a level playing field between telecom companies and OTT service providers, including the economic aspect. However, with the boom of data consumption in the country over the last two or three years, primarily led by OTTs, TRAI officials indicated that the economic aspect did not hold ground anymore. With this realisation, the regulator began looking at the security facet of the regulatory imbalance between the two kinds of players.
- While telecom players are subjected to lawful interception as per the telegraph law, OTT platforms, by virtue of not being licensed, are currently not subject to interception by law-enforcement agencies.

HOW WILL THE REGULATOR PROCEED WITH THE PROPOSAL NOW?

TRAI will submit its views to the Department of Telecommunications (DoT), which will decide on the next course of action.

- Currently, the regulator is learnt to be studying global practices as far as lawful interception on online platforms is concerned.
- It is also looking into whether other regulators and authorities have been provided any facilities for interception of communications, and could suggest that the platforms should provide the same facilities to the Indian government.

UNDER WHICH LAWS ARE TELECOM FIRMS CURRENTLY SUBJECT TO LAWFUL INTERCEPTION?

- The **Indian Telegraph Act, 1885** states that on the occurrence of any public emergency, or in the interest of public safety, the central government or a state government can take temporary possession — for as long as the public emergency exists or the interest of the public safety requires the taking of such action — of any telegraph established, maintained or worked by any person licensed under the Act.
- This mandates telecom companies to provide access to messages, calls, and logs of these in case a court order or a warrant is issued. However, the government, while clear on demanding access to message logs for law-enforcement purposes, is not relying on The Telegraph Act to meet this objective. Instead, it wants the platforms to come up with a solution to enable traceability.
- Apps such as WhatsApp, Signal, Telegram, etc. claim to provide end-to-end encryption of their messages. This has caused some uncertainty among the authorities on how they can seek access to messages.

WAY FORWARD

- Currently, there is no jurisdiction anywhere in which messaging apps have been known to provide access to their messages. However, pressure on such services to provide access for law-enforcement purposes has been rising everywhere.
- In India, Law and IT Ministry has repeatedly stressed the need to be able to trace messages to prevent serious crimes.
- While the Indian government has conceded that encrypted messages may not be accessible, it has asked the platforms to provide origin of messages that could possibly incite violence or other mischievous acts.

PLANETS & THEIR MOONS

The International Astronomical Union's Minor Planet Centre confirmed 20 new moons orbiting Saturn, making it the planet with the most moons in our Solar System, at 82.

HIGHLIGHTS

- The 20 had been discovered by Scott S Sheppard of the Carnegie Institution for Science. Until their confirmation, the planet with the most moons was Jupiter, at 79.
- A count of the moons listed on the NASA website shows that our Solar System's planets together have 205 confirmed moons now.
- Saturn and Jupiter, with 161 between them, account for nearly 80% of these. Another 20% are orbiting Uranus (27) and Neptune (14). Of the remaining three moons, one is Earth's own while the other two are with Mars.
- Mercury is so close to the Sun and its gravity that it wouldn't be able to hold on to its own moon. Any moon would most likely crash into Mercury or maybe go into orbit around the Sun and eventually get pulled into it. It is not yet clear, however, why Venus does not have a moon.

- The newly discovered moons of Saturn are about 5 km each in diameter. Seventeen orbit Saturn opposite to the planet's rotation, and three in the same direction as Saturn's rotation.

DEARNESS ALLOWANCE

The Union Cabinet decided to increase the Dearness Allowance (or DA) that it pays its current employees and existing pensioners by 5 percentage points. Accordingly, 50 lakh central government employees and 65 lakh pensioners will henceforth receive 17% of their basic salary as DA instead of 12%.

HIGHLIGHTS

- DA is provided by the government to its employees to cushion the impact of the rising cost of living. Inflation (or rate of increase in prices) eats away the buying power of money; hence the justification for DA.
- For instance, if the annual inflation is 5%, it means that a commodity that cost Rs 100 in the first year, would cost Rs 105 in the second. If the employee has a salary that allows her to spend Rs 100 on that commodity, she will be able to buy that commodity in the first year.
- However, in the second year, that Rs 100 will no longer be enough for the employee to buy that commodity, which now costs Rs 105, thanks to the inflation rate. It is to compensate for this gap that the government pays DA to its employees.
- To calculate DA, the government typically uses the All India Consumer Price Index-based inflation rate as a broad marker. For greater effectiveness, the DA is revised twice a year.

HOW WILL THE INCREASE IN DA NOW IMPACT THE ECONOMY?

- An increase in DA provides additional money in the hands of government employees. If all this additional money is spent, it will have a positive impact on the sagging consumption demand, which the biggest problem in the economy right now.
- However, the impact will depend on whether — and to what extent — employees actually spend this money. It is possible that given the prevalent sentiment of insecurity, they may choose to simply save it in their bank accounts. But given that deposit rates on short-term savings are being cut — SBI announced cuts — it seems likely that people would choose to spend, rather than save.
- But even if all this money is simply kept in the banks, it will help the economy by bolstering the flow of funds to the banking system.

DRAWBACK

- Yes, there is. This money will come out of the government's coffers. And to the extent that this will hit the resources available with the government, it will constrain economic activity.
- For example, under the current circumstances, when government is finding it difficult to raise revenues, an additional outgo for DA will either push the government to borrow money from the market — thus leaving less money to be lent to private businessmen and businesswomen — or it will come as the cost of some other expenditure such as the spending that could have built more roads or more schools.

AMAZON WEB SERVICES (AWS)

As India starts conversations on whether companies should keep more of their critical data within India, companies like Amazon Web Services (AWS) have started offering the option of choosing to keep the data within the boundaries of India.

A number of private companies, public sector institutions and even state governments have started opting for this.

HIGHLIGHTS

- To start with, it divides its services into its 22 regions around the world, one of which is Mumbai. Within each region, AWS has multiple availability zones, each basically a collection of one or more data centres.
- Overall, a region is a collection of three or more availability zones — Amazon does not share the number of data centres around Mumbai.

- Within the availability zone, AWS ensures that risks like floods are taken into consideration. So, if one data centre faces any risk of flooding, the other should have lower risk of flooding.
- Each availability zone is connected with a very high speed **'dark fibre' connectivity.**
- The customer gets the choice to store data within India or choose to move it outside. This can be done from the AWS console itself by selecting the region. "Customers for whom data sovereignty or data residency within India is important, like government customers, keep it in the Mumbai region".

BUNAD

- Called a "bunad", it is not a single kind of costume but an umbrella term with several regional variations.
- A bunad often includes an apron, a headdress, and a scarf or shawl, and is embroidered and embellished with buckles, ornaments, jewellery and at times, blades.

- Bunads are expensive and typically worn on festive occasions.
- There are 400 different variations that come in different styles for men and women.

EXOPLANETS

The hunt for extraterrestrial life, if any exists, depends on finding habitable planets, mainly outside our Solar System.

HIGHLIGHTS

- Today, exoplanets are being discovered very frequently — over 4,000 are known — which is remarkable progress from three decades ago, when not even one exoplanet was known.
- The first confirmed discoveries came in 1992, but these were orbiting not a star but the remains of one.
- The planet discovered by Mayor and Queloz in 1995 is 50 light years away, orbiting the star 51 Pegasus that is similar to our Sun.
- Called 51 Pegasus b, the exoplanet is not habitable either, but it challenged our understanding of planets and laid the foundation for future discoveries.
- Using a spectrograph, ELODIE, built by Mayor and collaborators and installed at the Haute-Provence Observatory in France, they predicted the planet by observing the "Doppler effect" — when the star wobbles as an effect of a planet's gravity on its observed light.
- It is a gas giant comparable to Jupiter, yet it very hot, unlike icy cold Jupiter; 51 Pegasus b is even closer to its star than Mercury is to our Sun. Until then, gas giants were presumed to be cold, formed a great distance from their stars.

E-ASSESSMENT SCHEME

The income tax department's National e-Assessment Centre (NeAC) was launched in New Delhi.

HIGHLIGHTS

- The e-assessment process is aimed at minimising the level of interaction between taxpayers and the Income-Tax Department, which leads to "certain undesirable practices on the part of tax officials".
- With the Central Board of Direct Taxes (CBDT) notifying the creation of the NeAC — which will serve as an independent office that will exclusively deal with e-assessment — the **Centre's plan to launch faceless and nameless assessment of tax payers** has now kicked into motion.

- The CBDT issued a circular few days ago directing that during the financial year 2019-20, all assessment proceedings should be conducted electronically.
- It has also directed tax officers to smoothly conduct assessment proceedings through **'E-Proceeding'** and that requisition of information in cases under 'E-Proceeding' should be sought after a careful scrutiny of case records.
- The issues will be specified on email and on the portal. All such communication will have a document identification number (DIN), using which you can search it on the income tax e-filing portal.
- The new initiative shall impart greater efficiency, transparency and accountability in the assessment process. There would be no physical interface between the tax payers and the tax officers.

TURKEY SET TO REDRAW MAP OF SYRIAN WAR

A looming Turkish incursion into northern Syria is set to reshape the map of the Syrian conflict once again, dealing a blow to Kurdish-led forces that have battled Islamic State while widening Turkey's territorial control at the border.

This would be Turkey's third such incursion since 2016. Motivated largely by the aim of containing Syrian Kurdish power, Turkey already has troops on the ground across an arc of north-western Syria, the last stronghold of anti-Damascus rebels.

Turkey's Frontline
Erdogan wants to force Kurdish militia away from the border
Syrian government · Jihadist opposition · Turkish army and Syrian opposition · Kurdish forces · Syrian opposition (U.S. backed) · Syrian opposition (Turkey backed)

Sources: Conflict Monitor by IHS Markit, areas of control as of Sept. 30, 2019; Office of the Turkish President — **Bloomberg**

WHAT DOES TURKEY WANT?

- Turkey has two main goals in northeast Syria: to drive the Kurdish YPG militia which it deems a security threat away from its border, and to create a space inside Syria where 2 million Syria refugees currently hosted in Turkey can be settled.
- It had been pushing the United States to jointly establish a "**safe zone**" extending 20 miles (32 km) into Syrian territory, but repeatedly warned it could take unilateral military action after accusing Washington of dragging its feet
- President Tayyip Erdogan has recently talked about pushing even deeper into Syria, beyond the proposed "safe zone" region to the cities of **Raqqa and Deir al-Zor**, in order to allow still more refugees to return to Syria.

HOW WILL THE KURDS BE AFFECTED?

- The Kurdish-led Syrian Democratic Forces (SDF) have spent years expanding its control across northern and eastern Syria, helped by the U.S.-led coalition against Islamic State.
- A rare case of a winner in the Syrian war, the Kurds and their allies have set up their own governing bodies while always insisting their aim is autonomy, not independence.
- All of this could unravel in the event of a major Turkish invasion that would plunge the area into warfare. The SDF-affiliated Syrian Democratic Council said an attack would trigger a new wave of mass displacement.

- For the SDF alliance, in which the Syrian Kurdish YPG militia is the dominant force, much will depend on whether the United States continues to keep forces in other parts of the northeast and east.
- A full U.S. withdrawal would expose the area to the risk of more Turkish advances, an Islamic State revival, or attempts by Iranian- and Russian-backed government forces to gain ground.
- Confronted by the prospect of US withdrawal last year, the Kurds beat a path to Damascus for talks over allowing the Syrian government and its ally Russia to deploy at the border.
- The talks made no progress, but such negotiations could be an option again in the event of a wider U.S. withdrawal.

HOW FAR COULD TURKEY GO?

- The north-eastern border region, currently controlled by Kurdish-led forces, stretches 480 km (300 miles) from the Euphrates river in the west to the Iraq border to the east.
- The immediate focus of Turkey's military plans appears to be around a section of the border between the towns of Ras al-Ain and Tel Abyad, which are about 100 km apart.
- Although under the control of Kurdish-led forces, that part of the border has historically had a strong Arab presence. "It's a region where the population is Arab and where Turkey has good ties with the leading groups".

DO RUSSIA AND IRAN BACK TURKEY'S MOVE?

- Russia and Iran, the other two major foreign powers in Syria, strongly support President Bashar al-Assad – unlike Turkey and the United States which both called for him to stand down and supported rebels fighting to overthrow him.
- If the US pulls out all its troops from northeast Syria, the Damascus government – backed by Russia – may try to retake control of much of the region not seized by Turkey.

WHAT IS THE WESTERN REACTION TO TURKEY'S PLAN?

- There has been no public support from Turkey's Western allies for its plan to settle 2 million Syrians – more than half of the refugees it currently hosts – in northeast Syria.
- The main Western concerns are that an influx of Sunni Arab Syrians into the largely Kurdish northeast would change the demographics of the region.
- The United Nations regional coordinator for the Syria crisis said all sides should avoid major displacement of civilians if Turkey launches an assault.

WHAT DOES THIS MEAN FOR ASSAD?

- While the territory in question is already outside Syrian government control, a Turkish incursion would mean the area switching from a non-hostile force – the SDF – to Turkey and rebels that have sought to topple Assad.
- Damascus has long viewed Turkey as an occupying power with designs on northern Syria.
- It has also at times suggested a willingness to strike a deal with the Kurds, though their last negotiations got nowhere.

WHAT COULD THIS MEAN FOR ISLAMIC STATE?

- Chaos could present Islamic State with an opportunity to stage a revival and the SDF has been conducting operations against IS sleeper cells since capturing its final territorial foothold earlier this year.
- Syrian Kurdish leaders have long warned that the SDF may not be able to continue holding IS prisoners if the situation was destabilised by a Turkish invasion.
- The SDF is still holding 5,000 IS fighters of Syrian and Iraqi nationality and a further 1,000 foreigners from more than 55 other states.

CHANDRAYAAN 2

The Indian Space Research Organisation (ISRO) tweeted that an instrument on Chandrayaan-2, CLASS, designed to detect signatures of elements in the Moon's soil, had detected charged particles during the mission. This happened during the orbiter's passage through the "geotail".

HIGHLIGHTS

> The Sun emits the solar wind, which is a continuous stream of charged particles. These particles are embedded in the extended magnetic field of the Sun. Since the Earth has a magnetic field, it obstructs the solar wind plasma. This interaction results in the formation of a magnetic envelope around Earth (see illustration). On the Earth side facing the Sun, the envelope is compressed into a region that is approximately three to four times the Earth radius. On the opposite side, the envelope is stretched into a long tail, which extends beyond the orbit of the Moon. It is this tail that is called the geotail.

- The geotail is a region in space that allows the best observations.
- The region exists as a result of the interactions between the **Sun and Earth.**
- Once every 29 days, the Moon traverses the geotail for about six days.
- When Chandrayaan-2, which is orbiting the Moon, crosses the geotail, its instruments can study the properties of the geotail.
- For the CLASS instrument seeking to detect element signatures, the lunar soil can be best observed when a solar flare provides a rich source of X-rays to illuminate the surface.
- Secondary X-ray emission resulting from this can be detected by CLASS to directly detect the presence of key elements like Na, Ca, Al, Si, Ti and Fe.

SULATANPUR LODHI & GURU NANAK DEV

A town in Punjab's Kapurthala district, Sultanpur Lodhi, is at the centre stage of the 550th birth anniversary celebrations of Guru Nanak Dev, founder of the Sikh religion. It is here that the main anniversary programme will be held on November 12, with the Prime Minister expected to attend.

HIGHLIGHTS

- It was in Sultanpur Lodhi that the Sikhism founder is believed to have attained enlightenment.
- The janamsakhis — birth stories or biographies of Guru Nanak Dev written towards the end of the 16th century — say he was a changed man after he took a dip in the rivulet Kali Bein that flowed through the middle of the town, and disappeared for three days.
- When the Guru resurfaced after three days, he uttered the seminal words, "**Na koi Hindu, Na koi Mussalman (People are neither Hindu nor Muslim)''.**
- He declared his own way. He had his own views about liberation. And it was after this that he started his mission.''
- The Guru also said he had seen the "**navkhand**".
- Those days, geographers had divided the earth into nine continents. It is after this episode in Kali Bein that Guru Nanak said he had seen all the nine continents.
- Guru Nanak was born at **Rai-Bhoi-Di Talwandi** in Sheikhupura district (now in Pakistan) in 1469. His father Mehta Kalyan Das is variously described as a revenue officer (patwari) or a chief accountant.
- He moved to Sultanpur Lodhi between late 1480 and 1490 at the invitation of his elder sister Nanaki and her husband Jai Ram, who was in charge of the **grain storage depot** (Modikhana) of Daulat Khan Lodhi, the then shiqqdar (commissioner) of Sultanpur Lodhi, who later rose to become the governor of Lahore.
- *There are conflicting accounts of the duration of his stay at Sultanpur Lodhi.* While historian Dr Ganda Singh writes he was there for 10 years between the ages of 18 and 27, Dr Hari Ram Gupta, another scholar, claims he was here from the ages of 16 to 30. But most scholars agree that he lived in the town for around a decade until 1500, when he decided to undertake his travels, **called udasis.**
- Since the revenue from 40-odd villages in Daulat Khan's jagir was collected in the form of grains, Modikhana was akin to a treasury. Nanak also started working there

LEGACY OF SULTANPUR LODHI

- Historians say it was in Sultanpur Lodhi that Guru Nanak came into intimate contact with Islam.
- The janamsakhis depict the tension between a section of the clergy and Guru Nanak following his enlightenment.
- His utterances were not received kindly by the qazi. He complained to Daulat Khan Lodhi that Nanak was being blasphemous.

- Daulat Khan Lodhi also challenged Guru Nanak Dev to say the namaaz with him. "Lore has it that after the namaaz, Nanak told him your prayers will not be accepted because all along you were worried about your foal falling into an open well in your courtyard.'' It is here that he said what you say is not as important as what you do.
- Janamsakhis claim Daulat Khan Lodhi became very fond of Nanak and defended him against critics. When Nanak decided to leave the town in 1500, he is said to have urged him to stay. But Nanak said it was a call from the supreme being and not his decision.
- Over time, Bhai Mardana, who accompanied Nanak on all his travels, and Daulat Khan, came to be considered among his two principal Muslim followers.

Today the town is home to several gurdwaras in the memory of Guru Nanak. Most of them were commissioned during the Khalsa empire when the Sikh rulers staked out the places associated with Guru Nanak and built gurdwaras there. Gurdwara Ber Sahib, built by the side of an old ber tree that is believed to be the one under which Guru Nanak would sit in meditation along the Kali Bein, was commissioned by Maharaja Jagatjit Singh of Kapurthala. The cornerstone was laid by Bhai Arjan Singh of Bagarian in 1937, and Maharaja Yadavinder Singh of Patiala presided over its completion in 1941.

ARCHITECTURAL HISTORY

- Sultanpur Lodhi was a major centre of Buddhism from the first century to the sixth century when it was called Sarwmanpur.
- In the 11th century, the town was founded by Sultan Khan Lodhi, a general of Mohammad Ghaznavi.
- Sikander Lodhi, assigned the construction of Sultanpur to Daulat Khan in the 15th century.
- It was the central point in the trade route between Delhi and Lahore.
- A footnote in Babarnama, the autobiography of Mughal emperor Babur, mentions Daulat Khan Lodhi as the founder of the town.

'A, B' FORMS
Candidates aspiring to contest assembly elections on the ticket of a political party are required to submit various documents and forms.

HIGHLIGHTS

- The documents include those on citizenship, age and caste (if they are contesting from a reserved seat), as well as an affidavit on criminal cases, if any, and property and cash owned by the candidates and their immediate family members.
- Perhaps the most important documents are **Form A and Form B,** which denote that *a certain candidate has been approved by a political party and should be allotted the election symbol of that party.*
- These two forms — referred collectively as 'AB Form' — prove that a political party has appointed a person in charge of distributing tickets and the candidate has obtained a ticket for a certain constituency from that person.

FORM A

- This is a communication from a 'recognised national or state political party' or a 'registered but unrecognised political party' to the returning officer of the constituency or the chief election officer of the state, conveying the names of office-bearers of the party, who have been authorised to intimate names of the candidates chosen by the party to contest the polls.
- This communication must come from either the president or secretary of the political party. These have to be signed and must carry the party seal.
- The form also contains specimen signatures of the office-bearers who have been authorised by the party to distribute tickets.

FORM B

- This is a communication from the authorised office-bearer of a political party (whose name is mentioned in Form A issued by the president or secretary of the party) to the returning officer of the constituency.

- This letter informs the returning officer about the name of the authorised candidate for the party, who should be allotted the party symbol.
- The letter also contains a substitute name for allotment of the symbol and candidature, in case the nomination of the primary candidate is rejected during scrutiny.
- Form B also certifies that the person to whom the authorised candidature has been issued is a member of the political party and his name appears in the party rolls.

EDGE COMPUTING

Cloud computing — by which remote servers hosted on the Internet store and process data, rather than local servers or personal computers — is ready to move to the next level.

Amazon, Microsoft, and Alphabet, the parent company of Google — the technology giants that provide cloud computing infrastructure to major corporates and governments — want to leverage 5G wireless technology and artificial intelligence to enable faster response times, lower latency (ability to process very high volumes of data with minimal delay), and simplified maintenance in computing.

This is where **Edge Computing** comes in — which many see as an extension to the cloud, but which is, in fact, different in several basic ways. By 2025, says the global research and advisory firm Gartner, companies will generate and process more than 75% of their data outside of traditional centralised data centres — that is, at the "edge" of the cloud.

EDGE COMPUTING

- Edge computing enables data to be analysed, processed, and transferred at the edge of a network.
- The idea is to analyse data locally, closer to where it is stored, in real-time without latency, rather than send it far away to a centralised data centre. So, whether you are streaming a video on Netflix or accessing a library of video games in the cloud, edge computing allows for quicker data processing and content delivery.

HOW IS EDGE COMPUTING DIFFERENT FROM CLOUD COMPUTING?

- The basic difference between edge computing and cloud computing lies in where the data processing takes place.
- At the moment, the existing Internet of Things (IoT) systems perform all of their computations in the cloud using data centres.
- Edge computing, on the other hand, essentially manages the massive amounts of data generated by IoT devices by storing and processing data locally.
- That data doesn't need to be sent over a network as soon as it processed; only important data is sent — therefore, an edge computing network reduces the amount of data that travels over the network.

AND HOW SOON CAN EDGE COMPUTING BECOME PART OF OUR LIVES?

- Experts believe the true potential of edge computing will become apparent when 5G networks go mainstream in a year from now. Users will be able to enjoy consistent connectivity without even realising it.
- Nvidia, one of the biggest players in the design and manufacture of graphics and AI acceleration hardware, has just announced its EGX edge computing platform to help telecom operators adopt 5G networks capable of supporting edge workloads.
- The new Nvidia Aerial software developer kit will help telecom companies build virtualised radio access networks that will let them support smart factories, AR/VR and cloud gaming.

FISHES & THE CLIMATE CHANGE

Among various ways in which climate change is impacting life on Earth, one has been to change the distribution of fish species in the oceans. Scientists have predicted that the shift will be towards the poles.

HIGHLIGHTS

- It stems from the way fish breathe. Scientists describe this with the **Gill-Oxygen Limitation Theory, or GOLT**.
- Warming waters have less oxygen. Therefore, fish have difficulties breathing in such environments. Additionally, such warming, low-oxygen waters also increase fish's oxygen demands because their metabolism speeds up.

- This is because, as fish grow, their demand for oxygen increases. However, the surface area of the gills (two-dimensional) does not grow at the same pace as the rest of the body (three-dimensional).
- The larger the fish, the smaller its surface area relative to the volume of its body.
- So, the fish move to waters whose temperatures resemble those of their original habitats and that satisfy their oxygen needs.
- As the global sea surface temperature has increased by approximately 0.13°C per decade over the past 100 years, "suitable" waters are more and more found towards the poles and at greater depths.
- Climate change will cause some fish species to shift their distribution by more than 50 km per decade.

NELLOPTODE GRETAE

The species has just got a name. Natural History Museum scientific associate Michael Darby, who is quoted on the Museum website as describing himself as a great fan of Greta Thunberg, has described the species and named it Nelloptodes gretae, after the teenage climate activist.

HIGHLIGHTS

- Between 1964 and 1965, an entomologist called William Brock collected samples of soil from around east Africa. Inside one of these samples, taken in Kenya and stored in the British Natural History Museum until now, was a tiny species of beetle, pale yellow and gold. Measuring just 0.79 millimetres, the beetle has no eyes or wings, with a small pit between where the eyes should have been.
- Biological names comprise two words, one for the genus and the second for the species. Traditionally, it is the species name that scientists coin to honour a prominent personality, and sometimes even a friend or a relative.
- While the species name gretae derives from Greta, the genus Nelloptodes too is new.
- Darby described not only the new genus and the species he named after Greta Thunberg, but eight other species of beetles, all within the same sample of soil. **All the nine species belong to a family called Ptiliidae. Darby has named many species of Ptiliidae beetles earlier.**
- Beetles of this family are found all over the world, yet they are not particularly well known because of their size — they are so small that even some single-cell animals are larger.

INS BAAZ

- INS Baaz is located at Campbell Bay on the Great Nicobar island, the southernmost and largest island of the Nicobar islands, in the Union Territory of Andaman and Nicobar Islands.
- This island is also the location of the Indira Point and is less than 250 km by sea from Banda Aceh in Indonesia.
- The Andaman & Nicobar Islands are strategically important for India's national security as they provide a critical capability to monitor sea areas in the region.
- Ihe Indian Naval Ship (INS) 'Baaz' was commissioned in July 2012, and is the southernmost air station of the Indian Armed Forces.
- Campbell Bay, where the base is located, is more than 1,500 km away from the Indian mainland, and 500 km from Port Blair.
- The primary functions of the INS Baaz include helping build Maritime Domain Awareness by providing information via airborne surveillance using aircraft and Unmanned Aerial Vehicles (UAVs).
- The base was first equipped with a runway of 3,500 feet but was later lengthened to enable larger aircraft to operate from it.
- The location has been described as India's "window into East and Southeast Asia", and is in close vicinity of the Six Degree Channel, also called the Great Channel, one of the Indian Ocean's busiest shipping lines, carrying strategic cargo to East Asian countries.
- It is also close to the Strait of Malacca.
- The INS Baaz helps to ensure maritime security in the Bay of Bengal and the Andaman Sea, and substantially enhances the Indian Navy's maritime surveillance capability.
- The base also assists the local populace in times of need such as facilitating evacuation during medical emergencies.
- It is a part of the Andaman and Nicobar Command, the only tri-services formation of the Indian Armed Forces that was started in 2001.

DAYLIGHT SAVING TIME

Clocks in Europe went back an hour, signalling the end of Daylight Saving Time (DST) this year. The same will happen with clocks in the United States, that is, November 3.

- In the Southern Hemisphere, the opposite has happened. Thus, clocks have gone ahead by an hour — in New Zealand, the switch happened on September 29, and in all states of Australia that have the practice of daylight saving (not all do), on the following Sunday, that is on October 6.

WHAT IS THE CHANGE WITH RESPECT TO INDIAN TIME?

- Now that DST has ended in Europe and clocks have gone back an hour, the time difference between London and India is five and a half hours (and that between Paris or Berlin and India is four and a half hours).
- Britain is now on Greenwich Mean Time (GMT); until Saturday when it was on DST or British Summer Time (BST), the time difference between London and India was four and a half hours (three and a half hours for Paris or Berlin).

DAYLIGHT SAVING TIME

- DST is in use during the period from spring to autumn (or fall), when Europe and the United States get an extra hour of daylight in the evening.
- No daylight is of course, actually 'saved' — rather, the idea is to make better use of daylight.
- So when it is autumn (or fall) in the Northern Hemisphere, and days are typically beginning to become shorter and nights longer, clocks are moved back an hour as governments decide to in effect transfer an hour of daylight from evening to morning, when it is assumed to be of greater use to most people.
- Dates for this switch, which happens twice a year (in the spring and autumn) are decided beforehand. By law, the 28 member states of the European Union switch together — moving forward on the last Sunday of March and falling back on the last Sunday in October.
- In the US, clocks go back on the first Sunday of November. Russia experimented with having permanent DST in 2011, but that created a situation in which it was dark at midday at some places, so in 2014, it returned to switching from DST to standard time in the autumn.

WHEN DID THE SYSTEM OF PUTTING CLOCKS FORWARD AND BACK START?

- The idea of fixing clocks to save energy and to make the day seem longer than it is, is over 200 years old, but its sustained implementation took longer.
- Written accounts suggest that a group of Canadians in Port Arthur (Ontario) were the first to adopt the practice on July 1, 1908, setting their clocks an hour ahead. Other parts of Canada followed suit.
- In April 1916, during World War I, with Europe facing severe coal shortages, Germany and Austria-Hungary introduced DST to minimise the use of artificial lighting. Many other countries on both the warring sides followed suit. The US introduced it in May 1916, and has stuck with it ever since.
- However, the move was in the end, only a ruse — and several European countries dropped it after the War ended in 1918. The practice returned again during the energy crises of the 1970s.

WHICH COUNTRIES IN THE WORLD HAVE THIS SYSTEM NOW?

- Europe, the US, and countries like Australia and New Zealand are top of the mind for Indians, but there are some 70 countries around the world that reset clocks in the spring and the autumn.
- In the US, it is practised everywhere except in Hawaii and most of Arizona.
- In Australia, DST is observed in New South Wales, Victoria, South Australia, and Tasmania besides some other, smaller territories; and not observed in Queensland and Western Australia among other territories.
- Countries around the equator (in Africa, South America, and southeast Asia) do not usually follow DST; there isn't much variation in the daylight they receive round the year in any case.
- **India does not have a DST**, even though there are large parts of the country where winter days are shorter. (There is also a separate debate around the logic of sticking with only one time zone in a country as large as India.)
- Most Muslim countries do not use DST — during the holy month of Ramzan, this could mean delaying the breaking of the fast for longer. Morocco has DST, but suspends it during Ramzan. However, Iran has DST, and stays with it even during Ramzan.

- Countries in East Asia and Africa mostly do not have a system of DST.

IS EVERYONE HAPPY WITH THIS CHANGING OF CLOCKS TWICE A YEAR?

- No, they are not. In fact, the European Parliament has voted to scrap DST, and starting 2021, the member states of the EU will choose between having a "permanent summertime" or "permanent wintertime".
- Those who choose the former will reset their clocks for the last time in March 2021; those who choose the latter would do so in October 2021.
- The vote in the European Parliament followed a survey by the European Commission. Out of 4.6 million responses, 84% voted in favour of scrapping DST.
- In the US, the changing of clocks is the subject of a debate that recurs every year, and a large number of people protest against the "torture".

BUT WHAT EXACTLY IS THE PROBLEM WITH DST?

- The basic idea of DST is under challenge from the way modern societies work. There are grave doubts that DST actually saves much energy.
- The rationale behind setting clocks ahead of standard time during springtime was to ensure that clocks showed a later sunrise and a later sunset — in effect, a longer evening daytime.
- Individuals were expected to wake up an hour earlier than usual, and complete their daily work routines an hour earlier.
- There would be an extra hour of daylight at the end of the working day, and translate into a lower consumption of energy.
- However, while more daylight did mean less use of artificial light a century ago when DST was introduced, modern societies use so much energy-consuming appliances all day long that the amount of energy saved is actually negligible.
- In a recent article, Popular Science magazine cited studies to list out the disadvantages of DST. One hour of lost sleep in the US, one study calculated, increases the fatal crash rate by 5.4% to 7.6% for six days following the transition.
- Other studies found a higher rate of workplace injuries after the switch, leading to loss days of work; a slight drop in stock market performance; health problems as a result of disruption of the circadian rhythm (body clock) — and even longer sentences ordered by judges deprived of sleep.

ULURU

On October 25, a last line of climbers scaled Uluru, Australia's famous desert rock. From October 26, climbing the rock, considered sacred by the local Anangu people, has been banned.

HIGHLIGHTS

- Uluru is an ancient sandstone monolith in Central Australia, famous for its gorgeous auburn hue, which seems to change with changing seasons and time of day. It is one of Australia's prime tourist attractions.
- The rock has a circumference of 9.4 km, and its 1,140-foot summit — taller than Eiffel Tower — has been a popular climbing destination.
- Uluru is considered sacred by Australia's indigenous Anangu people.
- **According to the Uluru-Kata Tjuta National Park website**: "The Central Australian landscape (of which Uluru and Kata Tjuta are an important part) is believed to have been created at the beginning of time by ancestral beings.
- Uluru and Kata Tjuta provide physical evidence of feats performed during the creation period…Anangu believe they are the direct descendants of these beings and are responsible for the protection and appropriate management of these ancestral lands."
- For the Anangu, every crack, crevice, cave on Uluru bears witness to stories they consider sacred — some so sacred they can't be shared with outsiders.
- While the local people have called it Uluru for thousands of years, in 1873, British-born explorer William Gosse "discovered" it and named it Ayers Rock, after the then-premier of the British colony of South Australia, Sir Henry Ayers.
- It was called Ayers Rock for more than 100 years, till in 1993, it was renamed "Ayers Rock/Uluru". This order of naming was reversed on November 6, 2002.

IS THERE SOMETHING LIKE AN ULURU IN INDIA?

Not exactly, but in India too, climbing certain mountain peaks is not allowed, because they are considered sacred by locals.

In August this year, the Centre had lifted an 18-year-old ban on scaling the Kanchenjunga, which people in Sikkim hold sacred. After protests, the Indian Mountaineering Foundation said it would not issue permissions to tourists to climb Kanchenjunga and other sacred peaks.

DOXXING

A court in Hong Kong has issued a temporary order, in effect until November 8, banning the practice of 'doxxing'.

HIGHLIGHTS

- Doxxing has emerged as one of the major tactics employed by pro-democracy protesters who have been carrying out relentless, sometimes violent, demonstrations that the administration has found impossible to suppress for over four months now.
- A common dictionary definition of doxxing (also spelt as 'doxing') is to publicly identify or publish private information about someone, especially with the intention of punishing or taking revenge.
- Doxxing first emerged as hacker slang for obtaining and posting private documents about an individual, usually a rival or enemy. To hackers, who prized their anonymity, doxxing was considered a cruel attack.
- In Hong Kong, protesters have been releasing information about police officers and their families, thereby opening them up to targeted violence or harassment and abuse, either physically or online.

ROLE OF MOUNTAIN STREAMS IN CARBON CYCLE

Mountains cover 25 per cent of the Earth's surface, and the streams draining these mountains account for more than a third of the global runoff.

HIGHLIGHTS

- Scientists have reported the findings of the first large-scale study of the carbon dioxide emissions of mountain streams, and their role in global carbon fluxes.
- They described their finding as unexpected — mountain streams have a higher average carbon dioxide emission rate per square metre than streams at lower altitudes, due in part to the additional turbulence caused as water flows down slopes.
  1. 5% — The proportion that mountain streams account for in the global surface area of fluvial networks.
  2. 10%-30% — The likely share of mountain streams in carbon dioxide emissions from all fluvial networks.

- The findings appear to indicate that the carbon dioxide comes from geological sources.
- The result shows how important it is to include mountain streams in assessments of the global carbon cycle.
- The scientists collected big environmental data from the streams draining the world's main mountain ranges. Then they used these big data to develop a model to estimate the natural carbon dioxide emissions from more than 1.8 million mountain streams worldwide.

CYCLONE KYARR

Cyclone Kyarr, which had formed close to South Konkan over the Arabian Sea, has moved away.

HIGHLIGHTS

- The cyclone formed over the Arabian Sea.
- It fell under the 'very severe cyclonic storm' category, with wind speed going up to 170-180 km/hour.
- This system was brewing at a location about 200 km off Ratnagiri on Maharashtra coast since early this week.
- As it intensified, the cyclone caused heavy rain, mainly over south Konkan and Goa, in the last three days. Madhya Maharashtra regions, including Pune and neighbourhood areas, experienced overcast conditions accompanied by light rain during this period.

SNOW LEOPARDS

On International Leopard Day, Union Minister for Environment, Forest and Climate Change launched a national-level protocol called the Snow Leopard Population Assessment in India (SPAI) to estimate the population of snow leopards in the Indian ranges.

HIGHLIGHTS

- In India, the snow leopard, which is listed on the IUCN red list of threatened species, faces threat from illegal poaching and trade among other reasons.
- Snow leopards are native to the alpine regions of Central Asia. It is because of their thick fur that they are able to survive harsh cold climates. Even so, during the winter months, they are likely to descend to lower elevations.
- While the feline is a carnivore, no known human casualty has been recorded till now.
- Snow leopards mostly prey on blue sheep and mountain ibex and their smaller prey include hares, game birds and marmots. A snow leopard can kill prey that is up to three times its own weight.
- In India, snow leopards mainly inhabit the higher Himalayan and trans-Himalayan landscape at an altitude between **3,000-5,400 metres**.
- These ranges span a combined area of about 1,00,000 sq km across Jammu and Kashmir, Ladakh, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh. This area contributes to about **five per cent of the global snow leopard range.**

WHY A PROTOCOL HAS BEEN LAUNCHED TO COUNT SNOW LEOPARD'S POPULATION?

- According to the national protocol, India offers one of the best ranges for research purposes on snow leopards due to long-term research and conservation efforts. Yet India, like some other snow leopard ranges across the world, lacks a population estimate for the snow leopard, making it difficult for conservation efforts to be effective.
- The launch took place during the fourth steering committee meeting of the **Global Snow Leopard and Ecosystem Protection Program** in New Delhi from October 23-34.
- The meeting was attended by ministers from countries with snow leopard ranges including Nepal and Kyrgyzstan, during which issues such as potential methods to protect snow leopards, protecting their habitat, innovation conservation policy and green economic development will be discussed.

HOW WILL THE PROJECT BE CARRIED OUT?

- The main sources of threat for snow leopards in India are climate change, unregulated tourism, retribution killing, poaching, illegal trade, infrastructure development in the mountains, and excessive livestock grazing.
- Under SPAI, a two-step process will be undertaken to estimate the snow leopard population.
  1. The first step involves an occupation-based assessment of snow leopard distribution, which will involve identifying the area where the study will be conducted. These estimates will be made by conducting preliminary surveys and using interview or sign-based methods.
  2. The second step involves population sampling for regional density estimation. To do this, a thorough review of already sampled areas will be carried out.
- Online tools including a data sharing portal, training app for identifying individual leopards through photographs and threat mapping tool are being developed by **GSELP in collaboration with partner organisations**.

GSLEP

- The Global Snow Leopard and Ecosystem Protection Program (GSLEP) launched PWAS (Population Assessment of the World's Snow Leopards) in 2018 to bring together snow leopard range countries in an effort to accurately estimate their population size and monitor them.
- At present, the number of snow leopards around the world is not known and the existing estimates may not be accurate.
- PAWS's goal is to have a "robust estimate" of the snow leopard population by 2022.
- SPAI is a part of India's PAWS effort.
- In partnership with 11 other snow leopard range countries under GSLEP, India will take part in the jointly initiated efforts.
- The other snow-leopard range countries are Afghanistan, Bhutan, China, Mongolia, Kazakhstan, Kyrgyzstan, Nepal, Tajikistan, Pakistan, Russia and Uzbekistan.

- According to GSELP the global population of snow leopards is estimated to be between 4,000-6,500, with the highest number of them in China, between 2,000-2,500. In India, the number could vary between 200-600, according to an evaluation carried out in 1994.

COSMIC YETI

Scientists have accidentally discovered what they describe as "the footprints a monstrous galaxy" in the early universe.

No evidence of any such galaxy had ever been found before. Hence, the scientists have equated these to the mythical Yeti: "Like a cosmic Yeti, the scientific community generally regarded these galaxies as folklore, given the lack of evidence of their existence, but astronomers in the United States and Australia managed to snap a picture of the beast for the first time,".

HIGHLIGHTS

- Recent studies found that some of the biggest galaxies in the young universe matured extremely quickly. This is something that is not yet understood theoretically.
- Also, puzzling is that these mature galaxies appear to come out of nowhere: astronomers never seem to catch them while they are forming.
- Now, the new finding could provide insights into the universe's infancy. The research team estimates that light from this galaxy has taken 12.5 billion years to reach the Earth.
- The galaxy had as many stars as the Milky Way and was forming new stars at a rate that was over 100 times faster than in the Milky Way.

QUANTUM SUPREMACY

Google announced that it has achieved a breakthrough called quantum supremacy in computing.

QUANTUM SUPREMACY

- It is a term proposed in 2012 by John Preskill, professor of theoretical physics at the California Institute of Technology.
- It describes the point where quantum computers can do things that classical computers cannot.
- In Google's case, researchers at the University of California, Santa Barbara have claimed to have developed a processor that took 200 seconds to do a calculation that would have taken a classical computer 10,000 years.

QUANTUM COMPUTER

- Traditional computers work on the basis of the laws of classical physics, specifically by utilising the flow of electricity.
- A quantum computer, on the other hand, seeks to exploit the laws that govern the behaviour of atoms and subatomic particles. At that tiny scale, many laws of classical physics cease to apply, and the unique laws of quantum physics come into play.
- It is about processing speed. Bits of information are stored as either 0 or 1. Every string of such digits (bitstrings) represents a unique character or instruction; for example, 01100001 represents the lowercase "a".
- In a quantum computer, information is stored in quantum bits, or qubits. And a qubit can be both 0 and 1 at the same time.
- Quantum physics involves concepts that even physicists describe as weird. Unlike classical physics, in which an object can exist in one place at one time, quantum physics looks at the probabilities of an object being at different points.
- Existence in multiple states is called superposition, and the relationships among these states is called entanglement.
- The higher the number of qubits, the higher the amount of information stored in them. Compared to the information stored in the same number of bits, the information in qubits rises exponentially. That is what makes a quantum computer so powerful.
- **This is entanglement**, which Einstein called "**spooky action at a distance**". Two entangled subatomic particles could be light years apart, and yet be linked. Quantum computers use these two properties to achieve speeds and

computational spaces that would defeat a classical machine, by encoding data into quantum states and performing quantum operations on it.

THE DARK SIDE

The dark side of quantum computing is the disruptive effect that it will have on cryptographic encryption, which secures communications and computers.

- Encryption depends on very large prime numbers, which serve as the seeds from which cryptographic keys are generated and exchanged by the parties to a conversation.
- It works because encryption and decryption are operationally asymmetric.
- It is easier for a computer to multiply very large prime numbers than it is to factor a product down to its constituent primes. This differential keeps your WhatsApp messages private, but if the odds were evened by exponentially powerful computers, privacy online would be dead.

ADJUSTED GROSS REVENUE

The Supreme Court upheld the Department of Telecommunications' (DoT) definition of adjusted gross revenue (AGR), a contentious point among India's telecom players and the source of a running battle between the government and industry for years.

The ruling will have major ramifications for the telecom companies, especially the older service providers such as Airtel and Vodafone Idea.

AGR

- Telecom operators are required to pay licence fee and spectrum charges in the form of 'revenue share' to the Centre. The revenue amount used to calculate this revenue share is termed as the AGR.
- According to the DoT, the calculations should incorporate all revenues earned by a telecom company – including from non-telecom sources such as deposit interests and sale of assets.
- The companies, however, have been of the view that AGR should comprise the revenues generated from telecom services only and non-telecom revenues should be kept out of it.

BACKGROUND

- The slugfest between DoT and the telecom companies has been on since 2005, when the the Cellular Operators Association of India — the lobby group for players such as Airtel and Vodafone Idea — challenged the DoT's definition for AGR calculation.
- Subsequently, in 2015, the TDSAT ruled that the AGR included all receipts, except capital receipts and revenue from non-core sources such as rent, profit on the sale of fixed assets, dividend, interest and miscellaneous income, etc.
- The government, meanwhile, continued to raise the issue of under-reporting of revenues to duck charges.

SMALLEST OZONE HOLE

During September and October, the ozone hole over the Antarctic has been the smallest observed since 1982, NASA and US National Oceanic and Atmospheric Administration (NOAA) scientists have reported.

- The annual ozone hole reached its peak extent of 16. 4 million sq km on September 8, then shrank to less than 10 million sq km for the remainder of September and October, satellite measurements show.

WHAT IS OZONE HOLE: Ozone, made up of three oxygen atoms, occurs naturally in small amounts. Roughly 10 km to 40 km up in the atmosphere (the layer called the stratosphere), the ozone layer is a sunscreen, shielding Earth from harmful ultraviolet radiation. On the other hand, close to the surface, ozone created as a by-product of pollution can trigger health problems such as asthma and bronchitis.

Manufactured chemicals deplete the ozone layer. Each spring over Antarctica (it is now spring there), atmospheric ozone is destroyed by chemical processes. This creates the ozone hole, which occurs because of special meteorological and chemical conditions that exist in that region.

WHY IT'S SMALL THIS YEAR: There have been abnormal weather patterns in the atmosphere over Antarctica. In warmer temperatures like this year, fewer polar stratospheric clouds form and they don't persist as long, limiting the ozone-depletion process.

EASE OF DOING BUSINESS

India has improved its score in the World Bank's global Ease of Doing Business rankings, rising 14 notches to be placed 63rd out of 190 countries on the back of "sustained business reforms".

- India, along with other top improvers, implemented a total of 59 regulatory reforms in 2018-19, accounting for a fifth of all reforms recorded worldwide.
- In the course of a year, India has made it easier to start a business in the country.
- It has further streamlined, in Delhi, the process and reduced the time and cost of obtaining construction permits and improved building quality control by strengthening professional certification requirements.
- In addition to this, Mumbai's streamlining of obtaining building permits has made it faster and less expensive to get a construction permit.
- Its efforts to make it easier to trade across borders and resolve insolvency have also helped improve its ranking.
- The government's goal was to be among the top 50 economies by 2020.
- The country still lags in areas like enforcing contracts and registering property.

AYE-AYE

In the island of Madagascar there lives an unusual little animal. Now, the world's weirdest little primate has just got even weirder.

HIGHLIGHTS

- Called the aye-aye, it is a primate that is unlike most other primates.

- A type of omnivorous and nocturnal lemur, the aye-aye has a tail longer than its body, incisors that are constantly growing, a third eyelid that moistens the eye and protects it from debris when the aye-aye gnaws on wood, females that produce ova throughout their lifetime — and strange hands.
- The aye-aye has highly specialised fingers, including elongated middle fingers, with which they locate and fish out insect larvae.
- Their fingers have evolved to be extremely specialised — so specialised, in fact, that they aren't much help when it comes to moving through trees".
- In these already strange hands, researchers have now discovered a sixth digit — a "pseudo-thumb". Among other mammals, the giant panda has a similar sixth digit.
- In the aye-aye, researchers believe that the pseudo-thumb might have developed to compensate for the highly specialised fingers, helping it grip better since the pseudo-thumbs are able to move in space and exert an amount of force equivalent to half its body weight.
- The pseudo-thumb has a bone, a cartilaginous extension and three distinct muscles that give it movement in three directions.

EL NINO

The El Niño is a widely discussed phenomenon, particularly in India where it can impact the southwest monsoon. In fact, El Niño events cause serious shifts in weather patterns across the globe.

In a new study, researchers have found that because of climate change, extreme El Niño events are likely to become more frequent.

HIGHLIGHTS

- El Niño is a climate phenomenon that takes place over the equatorial Pacific.
- It is one phase of an alternating cycle known as El Niño Southern Oscillation (ENSO).
- When there is a warming of the sea surface temperature in the eastern and central equatorial Pacific Ocean, it is known as El Niño. When the opposite cooling phase takes place, it is known as La Niña.
- ENSO can cause extreme weather events in many regions of the world, and therefore has very important implications for seasonal climate predictions, including the monsoon in India.
- While El Niño causes warmer temperatures over the equatorial Pacific, these are known to suppress monsoon rainfall.
- When La Niña happens, it has been found to be helpful in bringing good rainfall.

ADUCANUMAB

US-based biotechnology firm Biogen announced that it will seek regulatory approval from the US Food and Drug Administration (FDA) for its drug 'aducanumab', which is an investigational treatment for early Alzheimer's disease (AD).

- A new analysis called "EMERGE" led by the company in consultation with the FDA shows that administration of the drug may be able to reduce clinical decline in patients in the early stages of AD.
- If approved by the FDA, aducanumab will become the first therapy to reduce clinical decline in patients.
- According to US-based Alzheimer's Association, AD affects over 4 million people in India. Until now, no cure or a method to stop the progression of the disease exists.

WHAT IS AD?

- AD is a progressive brain disorder that affects older people, leading to loss of memory, decline in functional ability and change in personality and behaviour.
- Early onset AD, on the other hand, can affect individuals younger than 65 years of age.
- An individual affected by the disease may eventually be unable to perform everyday tasks.
- While AD is a disease, dementia is the name given to the symptoms of AD.
- Furthermore, AD is considered to be the most common cause of dementia, which can be caused by Huntington's and Parkinson's disease as well.
- In April 2011, new guidelines and criteria for diagnosis of AD were published. According to these criteria, there are three stages of the disease.
  1. The first is the preclinical stage, which may last for ten years or more and is marked by evidence of abnormal biomarker (biomarkers measure the severity of disease) patterns.
  2. In the second stage, some symptoms of AD, such as cognitive impairment can be noticed.
  3. The third stage is the complete manifestation of the disease.

- Early stage of AD is not the same as early onset AD, which is diagnosed in patients younger than 65 years of age. Aducanumab is meant to be effective for the patients in the former category.

MSMEs

It has been reported that the government will soon change the way it defines the micro, small and medium enterprises (MSMEs). The change in definition would require an amendment to the MSME Development Act. In February last year, the Union Cabinet had approved amendments to the MSMED Act and had decided to choose shift from a criterion of classifying MSMEs based on 'investment in plant and machinery' to a criterion based on 'annual turnover'.

SIGNIFICANCE

- According to a Reserve Bank of India report, the MSMEs are amongst the strongest drivers of economic development, innovation and employment.
- The MSME sector also contributes in a significant way to the growth of the Indian economy with a vast network of about 63.38 million enterprises. The sector contributes about 45% to manufacturing output, more than 40% of exports, over 28% of the GDP while creating employment for about 111 million people, which in terms of volume stands next to agricultural sector.

HOW ARE MSMES DEFINED AT PRESENT?

Table: Classification of MSMEs

Classification of the MSME	New Classification (annual turnover)	Previous classification – Ceiling on Investment in Plant and Machinery (in Rs)
Micro	Not exceeding Rs 5 crores	Below 25 lakhs
Small	Between Rs 5 crores to Rs 75 crores	25 lakhs to 5 crores
Medium	Rs 75 to Rs 250 crores	5 crores to 10 crores

- There has been no uniformity over the years about the definition of what exactly one means by "small scale industries" in India. Moreover, the definition also changes from one country to another.
- In India, for instance, under the Industrial Development and Regulation (IDR) Act, 1951, small industries were conceived in terms of "**number of employees**". But it was found that obtaining reliable data on the number of employees was difficult. As such, a proxy was found – and this was to look at the investments in plant and machinery; it was relatively easy to reliably ascertain and verify this data.
- So, at present, the classification of MSMEs is done based on investment in plant & machinery/equipment in accordance with the provision of **Section 7 of the MSMED Act, 2006.**

HOW DO OTHERS DEFINE MSMES?

- According to the World Bank, a business is classified as an MSME when it meets two of the three following criteria:
  1. Employee strength.
  2. Assets size.
  3. Annual sales.

SUKHNA LAKE

The Chandigarh administration had issued a draft notification for declaring Sukhna Lake as a wetland under the Wetland (Conservation and Management) Rule, 2017.

HIGHLIGHTS

- Sukhna Lake was declared a wetland more than 30 years ago as well. A status report placed before the Punjab and Haryana High Court recently stated that the UT administrator had issued such a notification on July 6, 1988, as well. The new notification will include the public's suggestions and objections as required under the 2017 rules.

HOW WILL THIS HELP SUKHNA?

- Declaring Sukhna a wetland will help preserve the lake and conserve its ecological and biodiversity.
- A major threat to Sukhna is the discharge of pollutants from neighbouring areas.
- Sukhna Wetland is spread over 565 acres.
- The catchment area of Sukhna Wetland spreading over 10,395 acres as finalised by the Survey of India includes 2,525 acres of Haryana and 684 acres of Punjab.
- With this, various activities will be prohibited/regulated/ promoted both in the wetland as well catchment areas.

WHAT ACTIVITIES WILL BE PROHIBITED?

- Encroachment of any kind, setting up of any industry and expansion of existing industries, manufacturing or handling or storage or disposal of construction and demolition waste covered under the *Construction and Demolition Waste Management Rules, 2016, hazardous substances covered under the Manufacture, Storage and Import of Hazardous Chemical Rules, 1989, or the Rules for Manufacture, Use, Import, Export and Storage of Hazardous Micro-organisms Genetically Engineered Organisms or Cells, 1989, or the Hazardous Waste (Management, Handling and Trans-Boundary Movement) Rules, 2008.*
- This also includes electronic waste covered under the *E-Waste (Management) Rules, 2016*, solid waste dumping, discharge of untreated waste and effluents from industries, cities, towns, villages and other human settlements and any construction of a permanent nature within specific distance of the wetland.

The administration had recently introduced a programme to include villagers of Kaimbwala under the 'Friends of Sukhna' — a voluntary program to keep a check on activities taking place in the area.

10TH GLOBAL WEALTH REPORT

The Credit Suisse Group, a Switzerland-based multinational investment bank, has released the 10th edition of its annual Global Wealth Report.

The report typically tracks both the growth and distribution of wealth – in terms of the numbers of millionaires and billionaires and the proportion of wealth that they hold – as well as the status of inequality around the world.

HIGHLIGHTS

- A key finding of 2019's report is that China has overtaken the United States this year to become "the country with most people in the top 10% of global wealth distribution". As things stand, just 47 million people – accounting for merely 0.9% of the world's adult population – owned $158.3 trillion, which is almost 44% of the world's total wealth.
- At the other end of the spectrum are 2.88 billion people – accounting for almost 57% of the world's adult population – who owned just $6.3 trillion or 1.8% of the world's wealth.
- The other way to look at this distribution of wealth is from the prism of inequality. The bottom half of wealth holders collectively accounted for less than 1% of total global wealth in mid-2019, while the richest 10% own 82% of global wealth and the top 1% alone own 45%," states the report.

Wealth is defined in terms of "net worth" of an individual. This, in turn, is calculated by adding up the value of financial assets (such as money) and real assets (such as houses) and then subtracting any debts an individual may have.

WHAT ARE THE DRIVERS OF THE WEALTH OF NATIONS?

Several factors can explain why wealth per adult follows a different path in different countries.

- For instance, the **overall size of the population** is one possible factor that drives wealth per adult in the country. For a country with a huge population, in terms of final calculation, this factor reduces the wealth per adult. But there is a flip side as well. A big population also provides a huge domestic market and this creates more opportunities for economic growth and wealth creation.
- Another important factor is the **country's saving behaviour**. A higher savings rate translates into higher wealth. The two variables share a strong positive relationship.
- But by far the most important factor in determining the different trends in household wealth among countries is the general level of economic activity as represented by **aggregate income, aggregate consumption or GDP**.
- That's because the expansion of economic activity increases savings and investment by households and businesses, and raises the value of household-owned assets, both financial and non-financial. But wealth and GDP do not always move in tandem, cautions the report. This is especially so when asset prices fluctuate markedly as they did during the financial crisis.

GREEN CRACKERS

In October 2018, the Supreme Court had ruled that only "green firecrackers" having low emission and permissible sound limits were to be sold and used. It had also fixed a timeslot for fireworks — between 8 pm and 10 pm on Diwali, and between 11.45 pm and 12.30 am on Christmas Eve and New Year.

HIGHLIGHTS

- This year, on October 5, in a bid to combat air pollution, the Union Ministry of Science and Technology launched environment-friendly firecrackers developed by the Council of Scientific and Industrial Research (CSIR) laboratories.
- CSIR-NEERI (CSIR-National Environmental Engineering Research Institute) states that it has been working since January 2018 to develop new and improved formulations for reducing emissions from fireworks.
- CSIR-NEERI developed new formulations for reduced emission light and sound emitting crackers (**SWAS, SAFAL, STAR)** with 30% reduction in particulate matter using Potassium Nitrate (KNO_3) as oxidant.
- In other words, the "green firecrackers" are supposed to have a changed composition of chemicals, and emit 30% less particulate matter when burned as compared to traditional firecrackers.

WHAT IS PARTICULATE MATTER?

- Particulate matter is a mixture of solid particles and liquid droplets suspended in the air.
- These include PM10, which are particles with a diameter equal to or less than 10 micrometres, and PM2.5 that are of diameter equal to or less than 2.5 micrometres.
- Numerous studies have linked particulate pollution exposure to many health problems, including premature death in people with heart or lung diseases.
- They can also settle on ground or water and, depending upon their chemical composition, may have an adverse impact on them.

COULD CONVENTIONAL CRACKERS HAVE BEEN TWEAKED TO OBTAIN SIMILAR RESULTS

- They could, and they have been modified. Apart from 'green crackers', there are other formulations based on new oxidisers, fuel and additives — singly or in combination — which have managed to reduce PM10 and PM2.5 emissions by more than 50%. These are being tested at present, and are showing encouraging results.
- Other than these new formulations, CSIR-NEERI also teamed up with fireworks manufacturers and "examined and assessed the possibilities of improvements in conventional formulations based on barium nitrate to meet the stipulated norms of green crackers".
- This effort too has produced some results. For instance, there is a light-emitting cracker that has partially substituted barium nitrate with potassium nitrate and strontium nitrate.
- Some of the 'green crackers' have also replaced barium nitrate as an oxidiser for combustion. Barium nitrate hurts health when inhaled, causing irritation in the nose, throat and lungs.
- High exposure to barium nitrate can also cause nausea and irregular heartbeat.
- Among the new firecrackers developed are environment-friendly versions of traditional anar, chakri, sparklers, and other light-sound emitting firecrackers.
- According to NEERI, these exploit the exothermic heat of materials such as zeolite, clay and silica gel for burning, and also match the performance of commercial firecrackers in terms of sound.S

HOW CAN A 'GREEN CRACKER' BE IDENTIFIED?

- A Quick Response (QR) code will be put on the firecrackers to differentiate them from conventional ones.
- The cost of these firecrackers would be the same as conventional ones, and that they are already available in the market.

HOW ARE 'GREEN CRACKERS' PRODUCED?

- Under the current framework, the composition of firecrackers is disclosed to manufacturers after signing of a Memorandum of Understanding and a non-disclosure agreement. Following this, manufacturers have to apply to the Petroleum and Explosives Safety Organisation (PESO) for authorisation.
- The samples thus produced are submitted to CSIR for emission testing.

BATTLE OF SINGHAGAD

Hailing from the Malusare clan, Taanaji is popularly remembered for the Battle of Singhagad that took place in the year 1670.

HIGHLIGHTS

- In the battle, Taanaji fought against Udaybhan Rathore, a formidable Rajput warrior, who was put in charge of Fort Kandhana (later named Singhagad) by Jai Singh.
- In the year 1665, the Treaty of Purandar was signed between Jai Singh and Shivaji. Amongst several demands, the treaty had required the Maratha ruler to give up Fort Kandhana to the Mughals. Located near Pune, the fort was one of the most heavily fortified and of high strategic importance.
- After it was taken over by the Mughals, the fort was guarded by Rajput, Pathan and Arab troop guards and was said to be impenetrable.
- The idea of Mughals taking control of the fort is said to have deeply disturbed and enraged Shivaji's mother Rajmata Jijabai.
- Upon knowing this, Shivaji entrusted Taanaji, the only man he could think of capable of reconquering the fort Kondhana at any cost.

KALYAN DARWAJA OF THE SINGHAGAD.

- In February 1670, Taanaji along with his troops marched towards the fort that had just two doors that were heavily guarded. It is said Taanaji's troop decided to enter the fort from the south side where there was only a deep cliff and no guards.
- According to legend, Taanaji brought along with his pet ghorpad, or monitor lizard, that could cling to rocks. A rope was tied around the lizard and it was made to climb up the cliff, paving the way for the soldiers to climb holding them.
- Even though the attack by Taanaji took the Mughals by surprise, the latter nonetheless outnumbered the Marathas.
- A fierce battle is said have taken place between the Rathore and Taanaji. The two clashed for long. Malusare was gravely wounded in the fight and died.
- Enraged by the death of their general, the Marathas fought under the leadership of his brother, Suryaji Malusare, and eventually vanquished the enemy.
- According to legend, Shivaji, upon hearing the news of Tanaji's demise, said Gad ala pan Sinha gela (Although the fort was captured, a lion was lost).
- The fort was renamed as Singhagad (lion's fort) by Shivaji to honour Tanaji.

SKIN-ON INTERFACE

Researchers from the University of Bristol in partnership with Telecomm ParisTech and the Sorbonne University in France have developed a skin-on interface that mimics the appearance of human skin and its ability to sense.

HIGHLIGHTS

- This development could take touch technology to the next level for interactive devices such as phones, wearables and computers.
- The interface is made up of layers of silicone membrane. It is, therefore, more natural than the hard casing of phones, and can detect gestures made by end-users.
- The artificial skin allows the device it is on to "feel" the user's grasp, including its pressure and location. Therefore, it can detect interactions such as tickling, caressing, twisting and pinching.
- While artificial skin has been studied in the field of robotics, the aim of those studies was either cosmetic or focussed on safety. This is the first time that the uses of "realistic" artificial skins are being considered for augmenting devices.

TASMANIAN TIGER

The Tasmanian tiger, or thylacine (a dog headed pouched dog) was an exclusively carnivorous marsupial that is considered to be extinct.

HIGHLIGHTS

- The last known thylacine died in captivity over 80 years ago, in Tasmania's Hobart Zoo in 1936.
- It may also be the only mammal to have become extinct in Tasmania since the European settlement.
- The thylacine, also known as the Tasmanian Wolf bears some resemblance to a dog, with its distinguishing features being the dark stripes beginning at the rear of its body and extending into its tail, its stiff tail and abdominal pouch.

US-INDIA DEFENCE TECHNOLOGY AND TRADE INITIATIVE

The ninth India-US Defence Technologies and Trade Initiative (DTTI) group meeting held in New Delhi.

BACKGROUND

- In August 2018, the US granted to India the designation of **Strategic Trade Authority Tier 1 or STA-1,** "providing India with greater supply-chain efficiency by allowing US companies to export a greater range of dual-use and high-technology items to India under streamlined processes." This authorisation is the equivalent of NATO allying with Japan, South Korea and Australia.
- The DTTI initiative is led by Undersecretary of Defence for Acquisition and Sustainment, Ellen M Lord from the United States and Secretary for Defence Protection, Apurva Chandra from India.

HIGHLIGHTS

- DTTI came about to expedite the scope of cooperation on defence technology that become narrow due to the presence of differing bureaucratic processes and legal requirements.
- Essentially, DTTI is an initiative to provide "increased US senior level oversight and engagement to get beyond these obstacles."
- While DTTI is not a treaty or law, it is a flexible mechanism to make sure that senior leaders from both countries are engaged consistently to strengthen the opportunities in the field of defence.
- Its central aims include strengthening India's defence industrial base, exploring new areas of technological development and expanding U.S.-India business ties.

ORIONIDS METEOR SHOWER

The Orionids meteor showers are known for their brightness and speed, travelling at about 66 km/s into the Earth's atmosphere.

HIGHLIGHTS

- According to NASA, over 30 meteor showers occur annually and are observable from the Earth.
- They are named after the constellation they appear to be coming from. Orionids meteor shower is believed to originate from the constellation Orion The Hunter.
- This point of origination is referred to as the radiant. Even so, this does not mean that the meteor showers originate from a particular constellation, but the name is given only for the purposes of identification.
- The Orionids meteor shower is not the only one that occurs annually.
- For instance, the Perseid meteor shower occurs every year in August and was first observed over 2000 years ago.
- Other meteor showers include Quadrantis, that happen between December-January, Lyrids in April, Leonids in November and Geminids in December

METEOR SHOWERS

- Meteors are bits of rock and ice that are ejected from comets as they manoeuvre around their orbits around the sun. The Orionids meteors emerge from the comet 1P/Halley.
- Meteor showers, on the other hand, are witnessed when Earth passes through the trail of debris left by a comet or an asteroid.
- When a meteor reaches the Earth, it is called a meteorite and a series of meteorites when encountered at once, is termed as a meteor shower.

- As it falls towards the Earth, the resistance makes the space rock extremely hot and as the meteorite passes through the atmosphere, it leaves behind a streak of hot glowing gas that is visible to the observers and not the rock itself.

WHY DO METEOR SHOWERS HAPPEN ON AN ANNUAL BASIS?

- Like the Earth orbits around the Sun, comets orbit around it as well. Although they may not be as circular as Earth but maybe lop-sided. Therefore, when comets come closer to the Sun, their icy parts melt and break off, forming the debris that the Earth may encounter around the same time every year as it makes way around its own orbit.
- In the case of the Orionids, each time the Halley comet, that takes 76 years to orbit around the Sun, reaches the inner solar system (comprising the terrestrial planets and asteroids), the icy and rocky dust is released into space.
- Parts of this debris become Eta Aquarids in May if they collide with the Earth's atmosphere.

WHERE IS IT OBSERVABLE FROM?

- NASA describes the Orionids meteor shower as the "most beautiful showers of the year."
- When meteorites travel as fast as the Orionids showers do, they leave behind a trail of hot gas and sometimes burn, becoming "fireballs", which means they become brighter than the planet Venus and therefore, may be visible for several seconds to a minute.
- The Orionids meteor shower is visible from both the Northern and Southern hemispheres after midnight.
- In order to view meteor showers, an area away from the city and street lights need to be sought.
- India lies in the northeastern hemisphere.

LEASING OUT ISLANDS

A Chinese company with close ties to the Chinese Communist Party has secured exclusive development rights for the entire island of Tulagi, giving it the right to develop major infrastructure projects, and even possibly use the island for building strategic assets.

The move by China is considered to be in furtherance of its aggressive foreign policy, which seeks to make Beijing a major sea power in the Pacific Ocean, where Tulagi is located.

HOW AND WHY ARE ISLANDS LEASED BY COUNTRIES?

- Territorial leases, which include leases of islands, are defined as "agreement(s), formalized in treaty form, whereby a state (lessor) leases part of its territory to another state (lessee), granting it, for a specified or non-specified period, more or less extensive rights, possibly including even the exercise of all sovereign rights, short of transfer of territorial sovereignty."
- States enter into territorial lease agreements when a transfer of sovereignty is considered too definitive a solution for resolving the problem at hand. As opposed to a complete transfer, leases are considered less extreme.

ACCORDING TO STRAUSS, THE REASONS WHY TERRITORIAL LEASES ARE MADE INCLUDE:

- The resolution of territorial disputes (eg. the lease of a port at Sevastopol, Ukraine, to Russia for its Black Sea naval fleet after the breakup of the Soviet Union).
- Securing political objectives (the leasing of parts of China by European powers during the 19th century as opposed to annexing them, thus saving China's prestige).

ARE THERE ANY EXAMPLES IN INDIA'S NEIGHBOURHOOD?

- An important example is that of the Diego Garcia island, around 1,800 km to the south of India in the Indian Ocean, which has been leased by the United States from the United Kingdom since 1966. A permanent US naval base on the island offers Washington strategic advantages in this region.
- China has also invested heavily in the Indian Ocean, such as in a special economic zone in Mauritius, where it plans to build a hub for logistics among other infrastructure projects.
- India has also joined the fray and has announced plans in 2015 to develop the **Agalega island in Mauritius** and **Assumption island in Seychelles**. In 2015, India signed an MoU with Mauritius for "improvement in sea and air transportation facilities" at the Agalega island, which is understood to refer to the building of strategic assets.

TULAGI ISLANDS

- Tulagi is part of the Solomon Islands, a sovereign country consisting of 6 large islands and over 900 smaller islands to the northeast of Australia in the Pacific Ocean.
- The island is considered important for its natural deep-water harbour. Because of this advantage, Tulagi during World War II served as the Pacific headquarters for the Allied forces.
- After World War II, the Solomon Islands remained close to the West, but the equation began to change with the rise of China as an economic and military giant beginning in the 1980s.

SPECTROSCOPY

The Indian Space Research Organisation (ISRO) released an image from Chandrayaan-2 showing measurements from the Moon, carried out by the instrument Imaging Infrared Spectrometer (IIRS). Such studies make up a branch of physics called spectroscopy.

HIGHLIGHTS

- It is well known how visible light can disperse into rainbow colours after passing through a prism.
- The science of spectroscopy grew from there, and today it has extended to include the study of interaction between matter and electromagnetic radiation.
- IIRS is designed to measure light from the lunar surface in narrow spectral channels (bands).
- It has the ability to split and disperse reflected sunlight (and its emitted component) into these spectral bands.
- From the reflected solar spectrum, scientists will look for signatures, including of minerals. This will help map the lunar surface composition, which in turn will help us understand the Moon's origin and evolution in a geologic context.

NAGAS & KUKIS

Two groups of the Kuki militants: the Kuki National Organisation (KNO) and the United People's Front (UPF) have sought the intervention of Prime Minister Narendra Modi to subdue the rising tension between the Kukis and the Nagas in Manipur.

HIGHLIGHTS

- October 17 marked the culmination of a three-year observation of a centenary since the "Anglo-Kuki War" (1917-1919) in Kangpokpi district of Manipur.
- The joint representation of the KNO and UPF was made after the Manipur government ordered the stone memorials installed by the Kukis be taken down— a move which both KNO and UPF found to be "peculiar" since no objection was made when the Nagas of Manipur celebrated the declaration of their Independence Day on August 14.
- Inevitably the Kukis feel discriminated, and under no circumstances will attempt to erase history be tolerated.

WHAT IS THE CAUSE OF RECENT TENSIONS?

- **In light of the centenary**, the Anglo-Kuki War Centenary Commemoration Committee under the aegis of Kuki Inpi Churachandpur (KIC), which is the apex body of Kuki people in various northeastern states, asked all Kuki villages to install memorial stones with the inscription, "In defence of our ancestral land and freedom", in remembrance of their forefathers who fought the British during the war.
- But Naga bodies objected to the Kukis installing these stone memorials on the Naga's ancestral land.
- The Nagas claimed that the Kukis have been trying to distort history as there has been no "Anglo-Kuki War" but a "Kuki Rebellion" in 1917.
- The United Naga Council (UNC), the apex body of the Nagas of Manipur, asserted that the term 'rebellion' is more appropriate as the Kuki rebellion against the British was for labour recruitment drive under the Labour Corps Plan. Following this, the Nagas conveyed to the state government to take appropriate steps such that the history of Manipur is not distorted.
- Tensions between the Kukis and Nagas are not new, and in light of them building up again, the Manipur government ordered that the stone memorials be taken down. KNO and UPF wrote to the PMO in response to this order.

WHAT HAS BEEN THE REASON FOR KUKI-NAGA CLASHES IN THE PAST?

- After the conclusion of the Anglo-Kuki War in 1919, for administrative and logistical ease, the state of Manipur was divided into four areas: Imphal, Churachandpur, Tamenglong (that was inhabited by the Kukis, Kabui Nagas and Katcha Nagas) and Ukhrul (that was inhabited by Kukis and the Tangkhul Nagas).
- The reorganisation of Manipur is cited to be the most central result of the war. The Kuki chiefs who were not used to any bureaucratic control in the earlier now had to function bureaucratically.
- Furthermore, it is believed that Kukis came to Manipur in the late 18th/early 19th century from neighbouring Myanmar. While some of the Kukis settled next to the Myanmar border, others settled in Naga villages, which ultimately became a contentious issue between the two tribes.
- The relationship between the two worsened during the colonial period and reached a low point during the Anglo-Kuki war, referred to as a "dark period" in the oral history of the Tangkhul Nagas. Essentially, identity and land govern their ethnic conflict.
- Recently, on September 13, The People's Chronicle reported that Kukis across the state of Manipur observed the "Kuki Black Day" to mark 26 years since the "Joupi massacre" during which, as a result of clashes between the Nagas and Kukis, over 100 Kuki civilians were allegedly killed in the hills of Manipur.

WHAT WAS THE ANGLO-KUKI WAR?

- Before the British came in, the Kukis had been one of the dominant tribes of hill areas surrounding Imphal during the rule of the Maharajas of Manipur.
- The Kukis exercised full control over their territory until then. Therefore, the Anglo-Kuki War was essentially a war for the independence and liberation of the Kukis from the imperialists.
- The war had unified the efforts of Kukis living in northeast India, Myanmar and Bangladesh.
- Even so, the state of Manipur had already lost its independence to the Britishers in 1891 and became free only after India became independent in 1947.
- The Anglo-Kuki War began when the Britishers asked the Kukis to get enrolled in their labour corps in France and the latter resisted.
- The Anglo-Kuki War, 1917–1919: A Frontier Uprising against Imperialism during the First World War", the course of the war can be divided into three phases: *the <u>first phase (March-October 1917</u>) was the phase of passive resistance, <u>the second phase (October 1917-April 1919</u>) was the period of armed resistance and the <u>third phase (April 1919 onward</u>) was the period of trial and tribulation.*
- The third phase was marked by Kukis serving collective punishments as the Kuki population was subjected to penal labour for five years and their leaders were transported and subject to trials.

GLOBAL HUNGER INDEX

The latest Global Hunger Index (GHI) has ranked India a lowly 102 among the 117 countries it has mapped.

In 2018, India was pegged at 103 but last year 119 countries were mapped. So, while the rank is one better this year, in reality, India is not better off in comparison to the other countries.

The GHI slots countries on a scale ranging from "**low" hunger to "moderate", "serious", "alarming", and "extremely alarming". India is one of the 47 countries that have "serious" levels of hunger.,**

HIGHLIGHTS

- On the whole, the 2019 GHI report has found that the number of hungry people has risen from 785 million in 2015 to 822 million.
- It further states that "multiple countries have higher hunger levels now than in 2010, and approximately 45 countries are set to fail to achieve 'low' levels of hunger by 2030".

GLOBAL HUNGER INDEX

- The GHI has been brought out almost every year by Welthungerhilfe (lately in partnerships with Concern Worldwide) since 2000; this year's report is the 14th one. A low score gets a country a higher ranking and implies a better performance.

- The reason for mapping hunger is to ensure that the world achieves "Zero Hunger by 2030" — one of the Sustainable Development Goals laid out by the United Nations. It is for this reason that GHI scores are not calculated for certain high-income countries.
- While in common parlance hunger is understood in terms of food deprivation, in a formal sense it is calculated by mapping the level of calorie intake.
- But the GHI does not limit itself to this narrow definition of hunger.
- Instead, it tracks the performance of different countries on four key parameters because, taken together, these parameters capture multiple dimensions — such a deficiency of micronutrients — of hunger, thus providing a far more comprehensive measure of hunger.

HOW DOES GHI MEASURE HUNGER?

For each country in the list, the GHI looks at four indicators:

* **Undernourishment** (which reflects inadequate food availability): calculated by the share of the population that is undernourished (that is, whose caloric intake is insufficient);

***Child Wasting** (which reflects acute undernutrition): calculated by the share of children under the age of five who are wasted (that is, those who have low weight for their height);

* **Child Stunting** (which reflects chronic undernutrition): calculated by the share of children under the age of five who are stunted (that is, those who have low height for their age);

* **Child Mortality** (which reflects both inadequate nutrition and unhealthy environment): calculated by the mortality rate of children under the age of five (in part, a reflection of the fatal mix of inadequate nutrition.

- Each country's data are standardised on a 100-point scale and a final score is calculated after giving 33.33% weight each to components 1 and 4, and giving 16.66% weight each to components 2 and 3.
- Countries scoring less than or equal to 9.9 are slotted in the "low" category of hunger, while those scoring between 20 and 34.9 are in the "serious" category and those scoring above 50 are in the "extremely alarming" category.

WHAT IS INDIA'S SCORE RELATIVE TO THOSE OF THE OTHERS?

- Among the BRICS grouping, India is ranked the worst, with China at 25 and a score of just 6.5. Within South Asia, too, India is behind every other country.
- Sri Lanka, Nepal, Bangladesh and Pakistan (in that order) are all ahead of India.
- Some of the other countries ahead of India are Saudi Arabia (rank 34), Venezuela (rank 65, even as its score has doubled from just over 8 to over 16, because of the socio-economic and political crisis), Lesotho (rank 79), Burkina Faso (rank 88), and North Korea (rank 92).
- In stark contrast to India, which has the world's largest democracy and one of the biggest economies, most of the countries below India on the GHI — Afghanistan, Haiti or Yemen etc — are either poorly governed or war-torn or ravaged by natural calamities.

PROJECT SOLI

- Project Soli, driven by Google's Advanced Technology and Projects (ATAP) team, was first showcased back in 2015.
- The idea is that a radar chip can be used to detect hand movements and gestures to interpret what they could mean.
- It's only recently that Google figured out how to reduce the size of this radar chip and fit it on the front of the smartphone, still ensuring accuracy. And that's why it is coming to Pixel 4.

SO, WHAT EXACTLY DOES THE SOLI RADAR CHIP DO?

- Soli is a dedicated radar chip on the front of the Pixel to collect raw data of hand gestures and then interpret them correctly for the right commands.
- Google says the miniature radar understands human motions at various scales, from the tap of a finger to the movements of the body.

- It is always sensing for movement while maintaining a low footprint — keep in mind Soli is not a camera and doesn't capture any visual images.
- Soli relies on a **custom-built machine learning (ML) model** to understand a large range of possible movements. Google says these models run on the device and sensor data is never sent to their servers.
- The Soli radar chip emits electromagnetic waves in a broad beam and when a human hand interacts with this, some of these waves are reflected back to the antenna. The ML-model quickly interprets the properties of the reflected signal to carry out the required command.
- This Motion Sense technology allows Pixel 4 users to wave their hands to snooze an alarm or skip songs or go back to the last song without touching the screen. Users will have the option of going to settings to turn Motion Sense on or off.
- However, Motion Sense will only work in countries where this radar tech has been approved for consumer use. The list includes "US, Canada, Singapore, Australia, Taiwan, and most European countries." India has not yet given a go-ahead for this technology.

SO WHY DOES INDIA NOT ALLOW THE SOLI CHIP?

- The Soli radar chip works on the 60 GHz spectrum frequency as it has the least interference for the kind of minute movements Google wants to track. However, the 60 GHz spectrum is not commercially usable in India.
- Most countries have already delicensed the 60 GHz band and this band has a good device ecosystem. The 60 GHz band is also known as V-band or WiGig band (Wi-Fi at 60 GHz) using IEEE 802.11ad protocol.
- The TRAI also recommends that the "….V-band (57-64 GHz) may be explored for allocation to the telecom service providers." But that is yet to happen. Without this USP available it the country, it would not have made much sense for Google to bring the pricey Pixel 4 to India.

NOBEL PRIZE 2019				
PHYSICS	**CHEMISTRY**	**PHYSIOLOGY OR MEDICINE**	**LITERATURE**	**ECONOMIC SCIENCE**
For contributions to our understanding of the evolution of the universe and Earth's place in the cosmos. **James Peebles (Winnipeg, Canada)** "for theoretical discoveries in physical cosmology". **Michel Mayor (Lausanne, Switzerland) and Didier Queloz (Geneva, Switzerland)** "for the discovery of an exoplanet orbiting a solar-type star".	**John B. Goodenough (Jena, Germany), M. Stanley Whittingham (United Kingdom) and Akira Yoshino (Suita, Japan)** for the development of lithium-ion batteries".	**William G. Kaelin Jr (USA), Sir Peter J. Ratcliffe (United Kingdom) and Gregg L. Semenza (USA)** "for their discoveries of how cells sense and adapt to oxygen availability".	**Peter Handke (Austria)** "for an influential work that with linguistic ingenuity has explored the periphery and the specificity of human experience".	**Abhijit Banerjee (INDIA), Esther Duflo (FRANCE) and Michael Kremer (USA)** "for their experimental approach to alleviating global poverty".

THE NOBEL PEACE PRIZE 2019

Abiy Ahmed Ali "for his efforts to achieve peace and international cooperation, and in particular for his decisive initiative to resolve the border conflict with neighbouring Eritrea".

ETHIOPIA-ERITREA CONFLICT

- In April 1993, Eritrea broke from its federation with Ethiopia, becoming an independent country that was located strategically at the mouth of the Red Sea on the Horn of Africa, in close proximity to one of the world's most crucial shipping lanes.
- Independence was the outcome of a 30-year war by Eritrean liberation fighters against Ethiopia, which had annexed the small multi-ethnic territory to its north in 1962.
- Just over five years after Independence, however, war broke out between the two countries over the control of Badme — a border town of no apparent significance, but which both Addis Ababa and Asmara coveted.
- Massive displacements of population followed, families were torn asunder, and the local trading economy was utterly destroyed. As the conflict evolved into a major refugee crisis, thousands of Eritreans fled to Europe.

END OF WAR

- In June 2000, the two countries signed an **Agreement on the Cessation of Hostilities**. It was followed, in December that year, by a **Peace Agreement in Algiers, Algeria**. This agreement formally ended the war and established a Boundary Commission to settle the dispute.
- The Commission gave its "final and binding" ruling in April 2002. Badme was awarded to Eritrea.
- However, Ethiopia refused to accept the decision without additional conditions, and a stalemate ensued. Ethiopia refused to give up control over Badme, and the border kept erupting in clashes.

ON ROAD TO PEACE: ABIY AHMED

- In 2017, Ethiopia's ruling Ethiopian People's Revolutionary Democratic Front (EPRDF) indicated that it was looking to change its relationship with Eritrea.
- In April 2018, Abiy Ahmed, then a 41-year-old former Army officer who had fought in the war, became Prime Minister. Things picked up pace immediately.
- In June, Prime Minister Abiy Ahmed broke the nearly two-decade stalemate, announcing that Addis Ababa would abide by the full terms of the 2000 agreement.
- On July 8, 2018, a day before he travelled to meet President Afwerki in Asmara, Prime Minister Ahmed made a rousing declaration: "There is no longer a border between Eritrea and Ethiopia because a bridge of love has destroyed it".

THE CONTEXT IN WHICH PEACE BROKE OUT

- Ethiopia is landlocked, and through the years of the war with Eritrea, had been dependent heavily on Djibouti, which sits on the Bab al-Mandab strait, for access to the Gulf of Aden and onward to the Arabian Sea.
- The peace deal with Eritrea opened up Eritrean ports for Ethiopian use, most prominently the port of Assab, located at the tip of the country's 'tail', to balance its reliance on Djibouti.

ERITREA'S INTEREST

President Afwerki had used the war with Ethiopia to keep himself in power since the country's independence in 1993. Over the past two decades, even as Eritrea sank steadily into economic stagnation and social and diplomatic isolation, he had built and maintained a large conscription army, kept the constitution under suspension, and muzzled the press, all in the name of fighting the "continuous occupation of Eritrean territories by Ethiopia".

The UN Human Rights Commission had repeatedly accused Eritrea of serious violations. The international pressure on its government had increased greatly after Eritreans fleeing the war and compulsory military service flooded European shores at the height of the refugee crisis in 2015-16.