



GS- 3- MAINS SPECIAL

Principles Of Applying Section 106 Of Evidence Act

Section 106 of the Indian Evidence Act, 1872, deals with the burden of proof in cases where a fact is within the special...

Mangaluru: Stone inscription related to Kulashekara Alupendra's death found at Someshwara temple

This inscription is very significant in the study of Tuluva history and culture. It has two panels on the top, and in between the two panels..

Centre's fiscal deficit at August-end touch 36% of full-year target: CGA

CGA, in the Department of Expenditure, Ministry of Finance, is the Principal Accounting Adviser to the Government of India. It was established in October 1975 to administer matters..

Genome-wide study of staghorn coral identified

It is one of the most important corals in the Caribbean. It, along with elkhorn coral and star corals built Caribbean coral reefs over the last 5,000 years...

CONTENTS

POLITY

- [Dr Jitendra Singh launches the Intelligent Grievance Monitoring System \(IGMS\) 2.0 Public Grievance portal and Automated Analysis in Tree Dashboard portal of DARPG](#)
- [Panchnama Inadmissible In Court Where Witnesses Merely Acted As Attestors And Did Not Disclose How Objects Were Discovered: Supreme Court](#)
- [Principles Of Applying Section 106 Of Evidence Act](#)
- [SC agrees to hear telcos curative plea on AGR dues in open court](#)
- ['My dream is to make 2 crore lakhpati didis': PM Modi on 77th Independence Day](#)
- [Cabinet has approved the establishment of the autonomous body Mera Yuva Bharat](#)
- [SLPs In Criminal Cases Don't Divulge Crucial Information](#)
- [Ministry of Development of North Eastern Region's Post](#)
- [High Court Cannot Exercise Writ Jurisdiction To Have Supreme Court Judgment Complied With: Allahabad HC](#)
- [Homebuyers Who Secure RERA Decrees Can't Be Treated Differently From Other Financial Creditors Under IBC : Supreme Court](#)
- [Govt approves seven bridge projects in Arunachal Pradesh under the Setu Bandhan Scheme](#)
- [NHAI Upgrades ATMS Standards for Enhanced Road Safety](#)
- [Exercise caution on portrayal of SCs, STs: BCCC to entertainment channels](#)
- [Lok Sabha Speaker refers complaint against TMC MP Mahua Moitra to ethics panel](#)
- [India: What is APAAR? Govt plans One Nation, One Student ID for school students](#)
- [General Provident Fund \(GPF\) payment on retirement](#)
- [Online registration begins for Yuva Sangam phase III](#)

ECONOMY

- [Top financial regulator seeks global clampdown on hedge fund borrowing](#)
- [NIIF unveils \\$600 mn India-Japan Fund](#)
- [RBI includes PM Vishwakarma under PIDF scheme; extends tenure of scheme by another two years](#)
- [RBI to introduce card-on-file tokenisation facility at issuer bank level](#)
- [REC launches 'SUGAM REC', a mobile app for 54EC Bonds Investors](#)
- [Reliance General Insurance Gets Show Cause Notices Worth Rs 922 Crore From GST Authority](#)
- [2023 Economics Nobel Prize](#)
- [Unemployment rate declined, says Centre's survey](#)

- [Govt tightens PLI rules for white goods](#)
- [India ranks 111 out of 125 countries in Global Hunger Index](#)
- [Indian Railways' PSUs, RITES Ltd and IRCON granted Navratna status](#)
- [Sigachi Industries Initiates 10:1 Stock Split](#)
- [SEBI Approached OCCRP for Documents on Adani Allegations](#)
- [BSE increases transaction charges on the derivative segment from November 1](#)
- [SC clarifies companies can't claim lower withholding tax under tax treaties without notification](#)

INTERNATIONAL RELATIONS

- [UK gives BAE 4 billion pound contract for AUKUS submarine programme](#)
- [UNCTAD calls for bold global action to decarbonise shipping](#)
- [India expresses commitment towards combating organised crimes at UNTOC](#)
- [India Re-elected as President of Asia-Pacific Institute for Broadcasting Development \(AIBD\) for a Third Successive Term](#)
- [Tanzania to join Big Cat and Global Biofuels Alliances after President Suluhu's meet with PM Modi](#)
- [Sri Lanka to take over as Chair of Indian Ocean Rim Association](#)
- [Vice President Jagdeep Dhankhar interacts with President of Inter-Parliamentary Union on P20 sidelines](#)

ENVIRONMENT

- [Genome-wide study of staghorn coral identified](#)
- [18 more pygmy hogs return to Manas National Park](#)
- [Mundanthurai Tiger Reserve to protect flora, fauna](#)
- [Newly discovered fish can change its colour like a chameleon](#)
- [Indian scientists discover active submarine volcano in Andaman sea](#)
- [Bihar to get second tiger reserve in Kaimur district](#)
- [Countries pledge to raise \\$12 billion to fund coral reef protection](#)
- [The Nilgiris' endemic tarantula could be under threat from habitat loss and climate change, say researchers](#)
- [Govt. to prepare inventory of land use adjacent to Kolleru wildlife sanctuary](#)
- [New dragonfly species discovered in Wayanad](#)
- [Earth's smallest flowering plant may become food, oxygen source for astronauts](#)
- [NGT seeks report on removal of invasive mussel species from Ennore-Pulicat wetland](#)
- [Surkhab birds arrive at Uttarakhand for winter stay](#)
- [Scientists discover massive long-necked dinosaur 'titan' in Spain](#)
- [Mont Blanc's mighty height shrinks by over 2 metres](#)
- [Indonesia reports a new Javan rhino calf, but population doubts persist](#)
- [Dancing frogs of Western Ghats among most threatened amphibians globally](#)

- [Arctic puffins evolved into a new species 6 generations ago, but they might be less fit to survive, a new study shows](#)
- [New species of bagworm moth discovered from Idukki](#)
- [Ancient Remnants of Long-Lost Tectonic Plate Revealed in Borneo](#)
- [NASA Shares Stunning Satellite Image Of 'Deception Island'](#)
- [On its Manesar campus in the Aravalis, NSG takes the battle to 'vilayati kikar'](#)
- [Gray whales experience major population swings as a result of Arctic conditions](#)
- [Hailstorm in Kulgam, Shopian damages harvest-ready apple](#)

SCIENCE & TECH

- [Senescent immune cells promote lung tumor growth](#)
- [WHO recommends second malaria vaccine](#)
- [Green Ammonia Imported through VOC Port](#)
- [Physicists who built ultrafast 'attosecond' lasers win Nobel Prize](#)
- [Cell biologists identify new organelle present in mammalian cells made of rings of DNA](#)
- [Iron Atoms Discovered on the Move in Earth's Solid Inner Core](#)
- [Personality Disorders Linked to Increased Risk of Fatty Liver Disease](#)
- [2023 Chemistry Nobel Prize: What are quantum dots and what is the work that won the prize?](#)
- [Even platypuses aren't safe from bushfires — a new DNA study tracks their disappearance](#)
- [Scientists develop enzyme mimetic with potential applications in wastewater treatment, healthcare](#)
- [PUSA-44 Paddy Variety Ban in Punjab](#)
- [FSSAI clarifies addition of protein binders not permitted in milk, products](#)
- [Phonotaxis: First sound, then motion](#)
- [What is Hemochromatosis, the rare genetic disorder that causes organ dysfunction?](#)
- ['Half of her brain switched off': California doctors perform 'special' surgery to save ailing girl's life](#)
- [FDA finds no misconduct at trial sites for Pfizer's Lyme disease shot](#)
- [CSIR-CCMB study to understand genetics behind diseases](#)
- [CDSCO approves ImmunoACT's CAR-T cell therapy](#)
- [Study reveals unexpected variation in genetic code of protist](#)
- [Egypt attains WHO 'Gold Tier' status in Hepatitis C Elimination](#)
- [India's first tilapia parvovirus reported in Tamil Nadu](#)
- [Cabinet approves royalty rates for lithium, two other strategic minerals](#)
- [Qualcomm, Google partner to make RISC-V chip for wearable devices](#)
- [Lao PDR becomes second country in 2023 after Bangladesh to eliminate lymphatic filariasis](#)
- [Triplex ELISA for Assessing Durability of Taenia solium Seropositivity after Neurocysticercosis Cure](#)

DEFENCE & SPACE

- [SAMPRTI-XI: Indian Army and Bangladesh Army commence joint military exercise](#)
- [DRDO's VSHORAD Missile System To Be A Game-changer For Short-range Threats](#)
- [Putin Claims Russia Successfully Tested a Nuclear-Powered Missile.](#)
- [Territorial Army inducts first batch of Mandarin-trained officers along LAC](#)
- [All about Israel's Iron Dome which took on 5,000 rockets launched by Hamas](#)
- [Indian-origin NASA scientist to lead rocket mission to 'ring of fire' eclipse. Explained](#)
- [IAF Chief unveils new Ensign as the force marks 91st anniversary](#)
- [More than 1.3 crore school students participate in 'Veer Gatha Project 3.0'](#)
- [Annual joint hadr exercise 2023 – \(chakravat 2023\)](#)
- [Israel Accused of Using White Phosphorous in Gaza, Lebanon](#)
- ["Starquakes" could explain mystery signals](#)
- [What is Jericho missile system? Israel's potential 'doomsday' nuclear option](#)
- [Defence Ministry Seals Rs 313 Crore Deal For Upgrade Of Warship INS Beas](#)
- [For the first time, an AI system discovers supernova without human intervention](#)
- ['Iron Beam': Israel's deadly laser tech can be used against Hamas' missiles; how it works](#)
- [Gaganyaan Mission: ISRO To Condustr TV-D1 Flight Test](#)
- [Is Halley's Comet returning?](#)

ART & CULTURE

- [PM offers prayers at temple in Rajasthan's Chittorgarh](#)
- [Largest Paleolithic Cave Art Site Is Discovered in Eastern Iberia](#)
- [First public sector caravan park in Kerala to come up at Bekal](#)
- [Mangaluru: Stone inscription related to Kulashekara Alupendra's death found at Someshwara temple](#)
- [36 held after violent clash at Bhimashankar temple](#)

SOCIETY

- [President of India presents National Service Scheme Awards](#)
- [Jammu and Kashmir's famed Pashmina gets geographical recognition with GI tag](#)
- [Andhra Pradesh's Bojjannakonda gets major facelift to draw more tourists](#)
- [Karnataka distributes title deeds to 114 Hakki Pikki, Iruliga tribal people](#)
- [How Chhatrapati Shivaji Maharaj killed Afzal Khan with his 'Wagh Nakh'](#)
- [First-Ever Yak Milk Product Receives Coveted GI Tag](#)

- [Pythagoras did not discover famed theorem! Babylonian tablet unearths plagiarism](#)
- [Udangudi Panangarupatti gets GI tag Thoothukudi district](#)
- [Govt mulling incentives for ASHA workers to mobilise individuals for sickle cell disease screening](#)
- [Geographical indication \(GI\) tag for Goan cashew \(kernel\)](#)
- [Council of Europe votes to recognize Holodomor as a genocide](#)
- [Army chief presents the president's colours to third battalion](#)
- [Saraswati Samman conferred on Tamil author Sivasankari](#)
- [How is GI-tagged Jaderi namakatti made in Tamil Nadu?](#)
- [Forest Department banks on native wisdom of Muthuvan tribe for Nilgiri Tahr conservation](#)
- [Tripura High Court to Chakma organisations for boycotting Christian converts](#)
- [Prime Minister extends best wishes on the auspicious occasion of KatiBihu to the people of Assam](#)

FACTS FOR PRELIMS

- [Mathematician Ruixiang Zhang to receive 2023 Sastra Ramanujan Prize](#)
- [UK's beloved Sycamore Gap cut down](#)
- [Sela Tunnel's 96% complete, may open by year-end](#)
- [Swamp Deer population sees a rise at Manas Tiger Reserve](#)
- [India kicking off Ichamati River dredging campaign](#)
- [19 dolphins rescued alive from canals of Ganga-Ghagra basin, says study](#)
- [Mundra Port Completes 25 Years](#)
- [PMO gets into act in satellite spectrum row of Musk, Ambani](#)
- [World's longest snake species found at IIT-Madras](#)
- [Sayeret Matkal, Israel's Tip Of The Spear, Preps For Hostage Rescue: Report](#)

POLITY

Dr Jitendra Singh launches the Intelligent Grievance Monitoring System (IGMS) 2.0 Public Grievance portal and Automated Analysis in Tree Dashboard portal of DARPG

Intelligent Grievance Monitoring System (IGMS) 2.0

- It is a **public grievance portal** and Automated Analysis in Tree Dashboard portal of the Department of Administrative Reforms and Public Grievances (DARPG).
- It has been **implemented by IIT Kanpur**.
- **Objectives:** The Dashboard provides instant **tabular analysis of Grievances Filed & Disposed**, State-wise & District-wise Grievances Filed & Ministry-wise data.
- It will also help the officials identify **the root cause of the grievance**.
- This portal will help the DARPG with creation of draft letter for selected scheme/ministry and expedite the grievance redressal process by the concerned ministry/department.
- It has been enabled with **Artificial intelligence (AI) capacity**.

CPGRAMS

- **Centralised Public Grievance Redress and Monitoring System (CPGRAMS)** is an online platform available to the **citizens 24x7 to lodge their grievances** to the public authorities on any subject related to service delivery.
- It is a single portal connected to all the Ministries/Departments of Government of India and States.
- Every Ministry and States has role-based access to this system.
- It is also accessible to the citizens through standalone mobile application downloadable through Google Play store and mobile application integrated with UMANG.
- The status of the grievance filed in CPGRAMS **can be tracked with the unique registration ID** provided at the time of registration of the complainant.

Panchnama Inadmissible In Court Where Witnesses Merely Acted As Attestors And Did Not Disclose How Objects Were Discovered: Supreme Court

Panchnama

- The word PANCHNAMA **literally means “record of observation by five people”**.
- A Panchnama is a document having legal bearings that **records evidences**

- and findings that an officer makes at the scene of an offence/crime.**
- However, it is **not only the recordings at the scene of a crime**; it can be **anywhere that may be related to the crime/offence** and from where incriminating evidence is likely to be collected.
 - The **word Panchanama is not used as such or defined particularly** anywhere in any book of law, but the **same can be read into Section 100 under Chapter VII of The Code of Criminal Procedure, 1973 (Cr.P.C.)**, which **mandates an Investigating Officer to prepare PANCHNAMA.**
 - **Reason behind the word "Panchanama":**
 - In the **ancient judicial system in India**, the **justice system at the lowest rung, i.e., village level**, which is still the case in certain kinds of issues, **was in the form of Panch, which is a group of five elected learned members of the village who would preside and decide** over a dispute amongst the villagers.
 - In the said system, the **proceedings before the Panch that were recorded** on paper, were often **called a Panchanama.**
 - **From this practice, the word was adopted** for a document prepared by the investigating office noting facts and the proceeds of an investigation.
 - **There are different kinds of Panchnama** prepared during an investigation, which are **categorized as search, seizure, recovery, discovery, arrest, inquest, and test identification parade.**
 - **Out of these, some are a part of the mandatory procedures** laid down in different provisions of the Cr.P.C and **others are performed to the establish genuineness** of the investigation.
 - **Contents of Panchanama:**
 - There is **no guidance or prescription about the contents** of Panchanama **under CrPC or any other statute.**
 - The **witnesses are called "Panchas".**
 - It is to be noted that the **Panchas are to be two or more independent and respectable persons**, e. persons who are not of disrepute.
 - **If there are no eyewitnesses** to an offence and the **case is totally based on circumstantial evidence**, then such a **Panchanama is of immense value.**
 - The **Panch (witness) can refresh his memories while giving evidence in the Court** as per Section 159 of the Indian Evidence Act, 1872.
 - **What is the need for the Panchanama?**
 - It is one of the **essential parts of criminal as well as civil investigation** procedures.
 - **In criminal investigation, it is used to support evidence of the investigation** conducted at the crime scene, seizure, if any from accused, identification of the accused, etc.
 - **In civil cases, it is used to show that the decree has been executed** by handing over possession of the property as directed in the decree.
 - The provision of the Panchanama is **made to convince the Court that the officer-in-charge has in fact carried out the investigation,**

search, or seizure or has acted upon the directions of the Court if so directed.

Principles Of Applying Section 106 Of Evidence Act

Section 106 of the Indian Evidence Act

- Section 106 of the Indian Evidence Act, 1872, **deals with the burden of proof in cases where a fact is within the special knowledge of a person.**
- This section **applies to civil and criminal cases** alike and lays down an important principle of evidence.
- The section **states that when any fact is especially within the knowledge of any person, the burden of proving that fact is upon that person.**
- This means that **if a fact is known to a particular person and not to others**, it is the **responsibility of that person to prove it in court.**
- For example, in a case where the ownership of a property is disputed, and the disputed property was in the possession of the defendant, the burden of proving that he acquired the property lawfully and has the right to possess it will be on the defendant.
- Similarly, in a criminal case where the accused is alleged to have killed someone with a knife, the burden of proving that the accused used the knife to commit the crime will be on the prosecution.
- **The burden of proof under Section 106 is not absolute**, and the person who has the special knowledge of the fact is **only required to prove it to the extent that is reasonable in the circumstances.**
- The person is **not required to prove the fact beyond all doubt, but only to the extent that a reasonable person would believe it to be true.**

SC agrees to hear telcos curative plea on AGR dues in open court

Curative Petition

- It is the **last resort to the highest court** that can be petitioned for redressal of grievances in court, and **its ruling is final.**
- It is a **way to ask the court to review and revise their own decision**, and it is **filed after a review petition is dismissed** or used.
- It is the **final and last option** for the people **to acquire justice**, as mentioned and **promised by the Constitution** of India.
- **Objective:** It is meant to **ensure there is no miscarriage of justice** and to **prevent abuse of process.**
- **Evolution:**
 - The concept of curative petition **originated** from the case of Rupa Ashok Hurra Vs. Ashok Hurra and another case (**2002) where the following **question arose** before the court of law: '**whether an**

aggrieved person is entitled to any relief against the final judgment/order of the Supreme Court, after the dismissal of a review petition?

- The **court used the Latin maxim “actus curiae neminem gravabit”**, which means that **an act of the court shall prejudice no one**.
- The maxim becomes **applicable when the court is under an obligation to undo a wrong done** to a party by the act of the court itself.
- This **led to the creation of the concept of a curative petition** by the Supreme Court to prevent the miscarriage of justice and to prevent the abuse of process.
- In this case, a five-judge constitution bench of the Supreme Court unanimously **held that in order to rectify gross miscarriage of justice, the court will allow the curative petition** filed by the victim.
- **Constitutional Backing:**
 - The concept evolved in the case of Rupa Ashok Hurra Vs, Ashok Hurra is **not newer to the constitution itself**.
 - **Article 137** of the Indian Constitution broadly **supports the idea of a curative petition**.
 - It states that the **"Supreme Court has the power to review any judgment pronounced (or order made) by it if the matter concerns the laws and rules made under Article 145**.
- **Criteria for admission:**
 - The court ruled that a curative petition can be entertained if the petitioner establishes there was a **violation of the principles of natural justice** and that he **was not heard by the court before passing an order**.
 - It will also be admitted where a **judge fails to disclose facts that** raise the apprehension of bias.
 - The SC has held that **curative petitions must be rare rather than regular** and be entertained with circumspection.
 - A curative petition must be **accompanied by certification by a senior advocate**, pointing out substantial grounds for entertaining it.
- **Who hears Curative petitions?**
 - A curative petition must first be **circulated to a bench of the three senior-most judges** and the **judges who passed the concerned judgment, if available**.
 - Only when a **majority of the judges conclude that the matter needs hearing** should it be listed, as far as possible, before the same bench.
 - A curative petition is **usually decided by judges in chamber**, unless a specific request for an open-court hearing is allowed.
 - It shall be **open to the Bench at any stage** of consideration of the curative petition **to ask a senior counsel to assist it as amicus curiae**.
 - In the event of the **bench holding at any stage that the petition is without any merit** and vexatious, **it may impose exemplary costs** on

the petitioner.

'My dream is to make 2 crore lakhpati didis': PM Modi on 77th Independence Day

Lakhpati Didi Initiative

- **It was announced by the Prime Minister** in his Independence Day speech on **August 15, 2023**.
- **Objective:** To **encourage women to start micro-enterprises** within their villages.
- Under the Lakhpati Didi Initiative, the **government aims to train two crore women**.
- The programme is **aimed at training women in self-help groups (SHGs)** so that they can earn a **sustainable income of at least Rs 1 lakh per annum** per household.
- The initiative has been **initiated by DAY-NRLM**, wherein **each SHG household** is encouraged to **take up multiple livelihood activities** coupled with **value chain interventions**, resulting in a **sustainable income of Rs 1 lakh or more** per year.
- Under this scheme, **women will be trained in various skills, such as plumbing, LED bulb making, drone operation** and repair, and tailoring and weaving.
- **After completing the training**, women will be provided with **opportunities to earn income using their skills**.
- The **ministry of rural development** is adopting a **whole-of-government approach** for maximum impact through convergence to **transform the rural economy with the** enabling of '**Lakhpati Didis**'.

Deendayal Antyodaya Yojana-National Rural Livelihoods Mission (DAY-NRLM)

- It is a **flagship poverty alleviation** program implemented by the **Ministry of Rural Development**, Government of India.
- **Aim:** To **reduce poverty** by **enabling the poor household to access gainful self-employment and skilled-wage employment** opportunities, resulting in sustainable and diversified livelihood options for the poor.
- DAY-NRLM **adopts a demand-driven approach**, **enabling the States to formulate** their own **State-specific poverty reduction action plans**.
- The Mission seeks to achieve its objective by investing in **four core components**.
 - **social mobilization**, promotion, and **strengthening of self-managed** and financially sustainable **community institutions of the rural poor women**;
 - **financial inclusion**;
 - **sustainable livelihoods**;
 - **social inclusion, social development** and access to entitlements

through convergence;

Cabinet has approved the establishment of the autonomous body Mera Yuva Bharat

Mera Yuva Bharat

- It is an **autonomous body** will benefit the youth in the **age group of 15-29 years**, in line with the definition of 'Youth' in the National Youth Policy.
- In case of programme components specifically meant for the adolescents, the beneficiaries will be in the age group of 10-19 years.
- It will help in Setting the focus of the Government on **Youth Led development** and to make the Youth "active drivers" of development and not merely "passive recipients".
- It will be launched on 31st October, 2023 on National Unity Day.
- **Objectives**
 - The primary objective of Mera Yuva Bharat (MY Bharat) is to make it a whole of Government platform for youth development.
 - Under the new arrangement, with **access to resources & connection** to opportunities, youth would become community change agents and nation builders allowing them to act as the Yuva Setu between the Government and the citizens.
 - It seeks to harness the immense youth energy for nation building.
- Mera Yuva Bharat supported by a technology platform would help to increase the Youth outreach efforts of the Department of Youth Affairs.

SLPs In Criminal Cases Don't Divulge Crucial Information

Special Leave Petition (SLP)

- The Supreme Court of India has been given extraordinary jurisdiction **under Article 136 of the Constitution**.
- By virtue of this Article, the **court can grant special leave to appeal from any judgment, decree, determination, sentence, or order in any cause or matter, passed or made by any court or tribunal in the territory of India (with the exception of military tribunals and court martial)**.
- It can **only be exercised when a substantial question of law or gross injustice** has been committed.
- **A judgement, decree, or order need not be final for an SLP. An interim or interlocutory order, decree or judgement can also be challenged.**
- It is a **discretionary/optional power of the SC** and the court may, in its discretion, decrease to grant leave to appeal.
- The **aggrieved party can't affirm a special leave to offer under Article 136 as a right**.

- **Who can file an SLP?**
 - Any aggrieved party can file SLP **against judgement or order of refusal of grant of certificate** for appeal to SC^{**}.^{**}
 - An SLP can be filed for **any civil or criminal matter, etc.**
- **Time limit to file SLP:**
 - It can be **filed against any judgment of the High Court within 90 days** from the date of judgment or
 - It can be **filed within 60 days against the order** of the High Court **refusing to grant the certificate of fitness** for appeal to SC.
- **Procedure for a Special Leave Petition (SLP):**
 - A SLP **must contain all the facts** upon which the SC is to decide, which revolve around the grounds on which an SLP can be filed.
 - The said petition needs to be **duly signed by an Advocate-on-Record.**
 - The petitioner must **include a statement** within the SLP **stating that no other petition has been filed in a High Court.**
 - Once the petition is filed, the **SC will hear the aggrieved party and depending upon the merits** of the case, **will allow the opposite party to state their part** in a counter affidavit.
 - **After the hearing, if the Court deems** the case **fit** for further hearing^{**}, it will allow the same; otherwise it will reject^{**} the appeal.

Ministry of Development of North Eastern Region's Post

Poorvottar Sampark Setu portal

- It is a powerful tool designed to streamline and enhance monitoring of Fortnightly visits of Union Ministers to NER.
- **Features:**
 - The dashboard provides **valuable insights and graphical information** about State-wise/ District-wise visits to the North Eastern Region by Union Ministers to be used by all the stake holders in one place.
 - The portal generates **a curated list of Ministers who can be nominated for visit** to NER in the upcoming months.
 - After the visit, the Minister can submit their tour reports along with their recommendations online.
 - MDoNER can forward the recommendations to respective line Ministries/Departments/State Governments for quick action, after analyzing the same. The Portal generates the summary report on the visits by a single click.

MDoNER Data Analytics Dashboard

- It has the **data of 112 schemes across 55 Departments and Ministries.**
- It will help in (a) Data driven decision making; (b) Ease of operations; (c) Centralized monitoring; (d) Policy level decision tool; and (e) Information integration.

- It will keep a close watch on NER Aspirational districts, North East border districts and the most backward districts in NER.

High Court Cannot Exercise Writ Jurisdiction To Have Supreme Court Judgment Complied With: Allahabad HC

Writ Jurisdiction of High Courts

- According to **Articles 12-35** of the Indian Constitution, **every citizen is given** a number of **Fundamental rights**.
- **Article 32 and Article 226** provide a **remedy for the protection of fundamental rights** by **allowing the Supreme Court and the High Court's, respectively, to issue writs** when a citizen's basic rights are violated.
- It allows the courts to **issue formal orders to the authorities in cases of violations of fundamental rights** by government authorities or government bodies.
- **Article 226 empowers the High Courts to issue writs not only for the enforcement of fundamental rights but also for any other legal right.** Thus, **writ jurisdiction of the High Court is wider than that of Supreme Court (SC)** because the **SC can issue writs only for the enforcement of fundamental rights** under Article 32.
- **The remedy provided under Article 226 of the Constitution is a discretionary remedy** of the court and thereby **cannot be claimed as a matter of right**.
- Thus, **unlike the Supreme Court, which must issue writs when fundamental rights are violated** (since the right to approach the SC in case of a violation of a Fundamental Right is in itself a Fundamental Right), the **High Court has discretion** when granting writs.
- **Under Article 226, a writ petition can be filed before any High Court** within **whose jurisdiction the cause of action arises**, either wholly or in part.
- It is **immaterial if the authority against whom the writ petition is filed is within the territory** or not^{**.*}

Types of writs mentioned in the Indian Constitution:

- **Habeas Corpus:**
 - 'Habeas Corpus' **literally means "to have a body of"**.
 - This writ is **used to release a person who has been unlawfully detained** or imprisoned.
 - By virtue of this writ, the **Court directs** the person so **detained to be brought before it** to examine the legality of his detention.
 - **If the Court concludes** that the **detention was unlawful**, then it **directs the person to be released immediately**.
- **Mandamus:**
 - Mandamus' **means 'we command'**.

- It is issued by the Court **to direct a public authority to perform the legal duties** which **it has not or refused to perform**.
- It can be **issued by the Court against a public official, public corporation, tribunal, inferior court** or the government.
- It **cannot be issued against a private individual** or body, the **President** or **Governors** of States, or against a **working Chief Justices**.
- **Prohibition:**
 - **It is issued** by the High Court or the Supreme Court **to the subordinate court or the tribunal to prevent them from exceeding their jurisdiction** which hasn't been vested upon them under the law.
 - It **cannot be applied to statutory bodies, administrative agencies,** or private individuals or businesses.
 - **Only judicial and quasi-judicial organisations are subject to it.**
- **Certiorari:**
 - **It is issued** by the High Court or the Supreme Court **to the judicial or quasi-judicial authorities when such authority passes the order without having jurisdiction** in such case, exceeding the jurisdiction conferred upon it, **or when it violates the principle of natural justice**.
 - It is **issued against a lower court or tribunal** in order **to transfer the matter to another superior body** for careful consideration.
- **Quo Warranto:**
 - It is issued by the court **to inquire into the legality of the claim made by the person who is holding a public office**.
 - The **ministerial office cannot be the target** of it.
 - This writ is **used to determine who has the legal authority to hold a public office** in the event of a disagreement.

Homebuyers Who Secure RERA Decrees Can't Be Treated Differently From Other Financial Creditors Under IBC : Supreme Court

Real Estate (Regulation and Development) Act, 2016:

- It is an **act passed** by the Indian Parliament **in 2016** for the **regulation and promotion of the real estate sector** in the country.
- This Act **establishes a Real Estate Regulatory Authority (RERA) in every state** to **regulate the real estate** sector and **serve as the adjudication body** to enable quick resolutions.
- It makes it **mandatory to register a real estate project with RERA, where the land area is more than 500 square meters or the number of apartments exceeds 8**.
- It **applies to both residential and commercial real estate**, whether undertaken **by a private or public body**.
- **Salient Provisions:**

- **Security:**
 - **At least 70% of the buyer's and investor's money will be deposited in a special account.**
 - **The remaining 30% will then be allocated to the builders for construction and land-related expenses only.**
 - **Developers and builders are not allowed to claim more than 10% as an advance payment on the property before the sale contract is signed.**
- **Transparency: Builders** are required to **provide the original plans** for all projects they carry out. They **are not allowed to alter the plans without the buyer's permission.**
- **Fairness:**
 - RERA has mandated that **developers sell properties on the basis of carpet area** rather than high-density area.
 - If the **project is delayed, buyers have the right to recover the full amount** of their investment, **or they can opt for an investment and receive a monthly return** on their investment.
- **Quality:** The **builder must rectify any issue faced by the buyer within 5 years of purchase.** This issue must be rectified within 30 days of the complaint.
- **Other Features:**
 - Establishment of a **fast-track mechanism for the settlement of disputes.** This will be done **via an appellate tribunal and dedicated adjudicating officers.**
 - **Each state/UT** has to **establish its own RERA and Appellate Tribunal** and also appoint adjudicating officers.
 - **In case a promoter wishes to transfer or assign a majority of your rights and liabilities** in a real estate project **to a third party, written consent from two-thirds of the allottees will be needed** in addition to the **written approval of RERA.**
 - If a person has any problems **regarding a violation of the provisions or rules of this Act by a promoter, buyer, or agent, they can file a complaint with RERA.**
 - **While an enquiry** is taking place, **RERA can stop** an agent, promoter, or buyer from continuing **any activity against which a complaint has been raised.**
 - **If any of RERA's decisions** regarding a complaint **is not satisfactory,** the aggrieved **party can submit an appeal before the Appellate Tribunal.**
 - **If the promoter fails to follow RERA's orders,** they will have to **pay a penalty.** This amount **could be up to 5% of the evaluated cost of the property.**
 - **If the Appellate Tribunal's orders are not complied with, a penalty** will have to be paid. This can **either be imprisonment for up to 3 years, or a fine (up to 10% of the approximate cost of the project), or both.**
 - **If a company commits an offence** under this act, any **person who**

was in charge of the business at the time of the offence being committed by the company **will be held guilty** and punished.

- **No civil court will have any jurisdiction with respect to any matter that comes under RERA or the Appellate Tribunal's jurisdiction.** As such, no court can grant an injunction with regard to any action taken by RERA or the Tribunal.

Govt approves seven bridge projects in Arunachal Pradesh under the Setu Bandhan Scheme

Setu Bandhan Scheme

- It is an initiative of the **Ministry for Road Transport and Highways.**
- **Objective:** It has been introduced to improve inter-state connectivity, especially in rural areas at the borders where state roads do not get the required attention.
- It is aimed at replacing **railway line Level Crossings (LCs)** with **Road Over Bridges (ROBs)/Rail Under Bridges (RUBs)** in states.

Central Road and Infrastructure Fund

- It was established in 2000 under the **Central Road Fund Act, 2000.**
- It was previously known as **Central Road Fund.**
- Its subject matter **belongs to the Ministry of Finance.**
- The fund consists of a **cess imposed along with excise duty on petrol and diesel.**
- The Central Road Fund Act, 2000, was amended in 2018 and its objectives are as follows
 - To use proceeds of the road cess under CRIF to finance other infrastructure projects such as **waterways, some portion of the railway infrastructure, and even social infrastructure**, including education institutions and medical colleges.

NHAI Upgrades ATMS Standards for Enhanced Road Safety

Advanced Traffic Management System (ATMS) Standards

- **Aim:** To **enhance road safety**, reducing incidence response time and **digital enforcement on national highways and expressways.**
- The new standard **includes the following features**
 - It provides for the implementation of digital highways by developing integrated utility corridors along the national highways to develop **optic fibre cables (OFC) infrastructure.**
 - Under the new standards, **the existing VIDS cameras** will be replaced

ECONOMY

Top financial regulator seeks global clampdown on hedge fund borrowing

Financial Stability Board (FSB)

- FSB was **established by the G20 in 2009 in the wake of the financial crisis.**
- **Mandate:** It was created expressly to **coordinate at the international level the work of national financial authorities and international standard-setting bodies** and to develop and promote the implementation of effective regulatory, supervisory, and other financial sector policies **in the interest of financial stability.**
- The FSB **brings together national authorities responsible for financial stability** (central banks, supervisory authorities, and finance ministries), international organisations, and standard-setting bodies.
- The FSB **operates by monitoring, analyzing, and making recommendations** on key aspects of the financial system. It assesses emerging issues that could impact global financial stability.
- The FSB's **decisions are not legally binding** on its members.
- **Headquarters: Basel, Switzerland.**
- **Members:**
 - The FSB consists of 68 member institutions. It comprises several **central banks, ministries of finance, and supervisory and regulatory authorities** from 25 jurisdictions, as well as 10 international organizations and six Regional Consultative Groups (RCGs).
 - The board **includes all G20 major economies.**
- **Structure:**
 - **The Plenary, which serves as the sole decision-making body.**
 - **The Steering Committee, which takes forward operational work** in between plenary meetings.
 - **Three Standing Committees, each with specific but complementary responsibilities.**
- **India and FSB:** India is an **active member of the FSB, having three seats in its Plenary** represented by the Secretary (Dept of Economic Affairs), **Deputy Governor-RBI, and Chairman-SEBI.**

Centre's fiscal deficit at August-end touch 36% of full-year target: CGA

Controller General of Accounts (CGA)

- CGA, **in the Department of Expenditure, Ministry of Finance,** is the **Principal Accounting Adviser to the Government of India.**

- It was **established in October 1975** to administer matters pertaining to the departmentalisation of the accounts of the Union.
- **Functions:**
 - CAG is responsible for **establishing and managing a technically sound management accounting system.**
 - The Office of CGA **prepares monthly and annual analysis of expenditure**, revenues, borrowings, and various fiscal indicators for the Union Government.
 - It further **formulates policies relating to general principles**, forms, and procedures of accounting for the Central and State Governments.
 - It **administers the process of payments, receipts, and accounting in the Central Civil Ministries/ Departments.**
 - Through its **Internal Audit Units in the respective Ministries/Departments**, it is responsible for **maintaining the requisite technical standards of accounting in the departmentalized accounting offices** and for monitoring the financial performance and effectiveness of various programs, schemes, and activities of the civil ministries.
 - It also **administers banking arrangements for the disbursements of Government expenditures and the collection of government receipts and interacts with the Central Bank for the reconciliation of cash balances** of the Union Government.
 - CGA is also **responsible for coordination and monitoring the progress of the submission of corrective/remedial action taken notes (ATNs) on the recommendations contained in Public Accounts Committee's (PAC) reports as well as the Comptroller & Auditor General (CAG) reports** through its web based Audit Para Monitoring System (APMS).
 - It also **looks after the pensions of the Central government employees.**

NIIF unveils \$600 mn India-Japan Fund

National Investment and Infrastructure Fund

- It is an investor-owned fund manager, **anchored by the Government of India** (GoI) in collaboration with leading global and domestic institutional investors.
- It is India's first-ever sovereign wealth fund (SWF) which was **set up in the year 2015.**
- It is an institution for enhancing infrastructure financing by **investing in greenfield (new), brownfield (existing) and stalled projects.**
- The primary goal of setting up NIIF was to **optimise the economic impact** largely through investing in **infrastructure-related projects.**

- **Types of NIIF Funds**
 - **Master Fund:** This fund primarily **invests in infra-related projects** such as roads, ports, airports, and power. Also, the master fund invests in well-established enterprises that are into a long-term agreement and are operating in a regulated environment with a good history.
 - **Fund of Funds:** It looks **to invest in funds managed by the renowned fund managers** having an excellent track record. The fund of funds invests as anchor investors, and this enables the fund managers to accumulate more funds from the institutional investors
 - **Strategic Fund:** This **fund is registered as an Alternative Fund II** under the Securities and Exchange Board of India (SEBI) in India. Strategic funds invest primarily in equity and equity-linked instruments.
- The funds are registered as **Alternative Investment Fund (AIF)** with the Securities and Exchange Board of India (SEBI).

RBI includes PM Vishwakarma under PIDF scheme; extends tenure of scheme by another two years

Payments Infrastructure Development Fund (PIDF) Scheme

- It was first **launched by the RBI in January 2021 for a period of three years.**
- **Objective: Increasing the number of payment acceptance devices** multifold in the country.
- PIDF is a **fund set up by the RBI**, in consultation with major authorised card networks, **to facilitate the development of payment acceptance infrastructure in tier-3 to tier-6 cities and the north-eastern states** of India.
- **The Union Territories of Jammu and Kashmir and Ladakh** will also be **given special focus.**
- **Beneficiaries of the PM SVANidhi Scheme** in Tier-1 and 2 centres **were later included** in August 2021.
- **Funding:**
 - The PIDF is **funded by the RBI and the major authorized card networks** in India.
 - The scheme **provides financial assistance to banks and non-bank financial companies (NBFCs) for the deployment of PoS terminals** and other payment acceptance infrastructure in eligible regions.
- **Allocation:**
 - When establishing criteria for fund allocation, **the primary objective will be to identify and assist merchants who have not yet adopted payment acceptance technology**, specifically those who lack any payment acceptance devices.

- These merchants may be **eligible to receive one physical and one digital acceptance device** each through the program.
- **Merchants providing essential services** (transport, hospitality, etc.), **government payments**, fuel pumps, PDS shops, healthcare, kirana shops, street vendors, etc., **may be covered, especially in the targeted geographies.**
- **Governance:**
 - The PIDF will be **governed through an Advisory Council** and managed **and administered by the RBI.**
 - The **implementation of targets shall be monitored by the RBI with assistance from card networks**, the Indian Banks' Association (IBA) and the Payments Council of India (PCI).

PM Vishwakarma scheme

- It is a **Central Sector Scheme launched on 17th September, 2023, with a financial outlay of Rs.13,000 crore.**
- **Time period: Five years** (FY 2023-24 to FY 2027-28).
- **Aim:**
 - **This initiative supports** small businesses, focusing on **traditional artists and craftspeople.**
 - It **provides small workers and craftsmen with financial help, training**, improved methods, and **skill mentoring.**
 - It also **aims at improving the quality as well as the reach of the products** and services of artisans and craftsmen.
- Under this scheme, the artisans and craftspeople **will be provided recognition through the PM Vishwakarma certificate and ID card, credit support upto 1 lakh** (first tranche) and **Rs.2 lakh (second tranche)**, with a **concessional interest rate of 5%.**

PM SVANidhi Scheme

- **Pradhan Mantri Street Vendor's AtmaNirbhar Nidhi** (PM SVANidhi) Scheme was launched by the Government of India in June, 2020.
- **Objective:** To **empower street vendors by not only extending loans to them** but also for their holistic development and economic upliftment.
- The scheme intends to **facilitate-collateral free working capital loans of up to Rs.10,000/- of one-year tenure, to approximately 50 lakh street vendors.**
- **Nodal Ministry: Ministry of Housing and Urban Affairs**

RBI to introduce card-on-file tokenisation facility at issuer bank level

Card-on-File Tokenisation

- Tokenisation refers to **replacement of actual credit and debit card details**

with an alternate code **called the “token”**, which will be unique for a combination of card, token requestor and device.

- This shall be unique for **a combination of card, token requestor** (i.e. the entity which accepts request from the customer for tokenisation of a card and passes it on to the card network to issue a corresponding token) and **the merchant** (token requestor and merchant may or may not be the same entity).
- **Advantage:** A tokenised card transaction is **considered safer** as the actual card details are not shared with the merchant during transaction processing.
- Customers who do not have the tokenisation facility will have to key in their name, 16-digit card number, expiry date and CVV each time they order something online.

Card-on-File transaction

- It is transaction where in **cardholders authorizes merchants to store their payment information** securely and bill cardholders' stored accounts for future purchases.

REC launches 'SUGAM REC', a mobile app for 54EC Bonds Investors

SUGAM REC App

- It is exclusively for current and future investors **in REC's 54EC Capital Gain Tax Exemption Bonds.**
- Investors will be able to **download their e-bond certificates, apply for fresh investment**, download important forms related to updating of KYC, and also connect with REC's Investor Cell via call / email / WhatsApp.

54EC bonds

- These are also known as **Capital gain bonds** are fixed income instruments which provide capital gains tax exemption under section 54EC to the investors.
- These bonds allow an assessee/investor to save income tax on long-term capital gain by investing the gains.
- The investment into these bonds **has to be made within 6 months** from the date of long-term capital gain.
- They have a fixed **lock-in period of 5 years** and can be either **held in Physical or Demat form.**
- They are issued by various institutions managed by the Government of India to finance specific capital projects.
- They are called 54EC bonds because the taxability benefits of these bonds are mentioned **under section 54EC of the Income Tax Act, 1961.**

REC Limited

- It is a '**Maharatna**' company (under the administrative control of the **Ministry of Power, Government of India**).
- It is registered with RBI as **non-banking finance company** (NBFC), Public Financial Institution (PFI) and Infrastructure Financing Company (IFC).
- It was **incorporated in 1969** in the **backdrop of severe drought and famine** in the country, to energise agricultural pump-sets for irrigation purposes, thereby reducing the dependency of agriculture on monsoons.
- It provides **long terms loans and other financing products** to State, Centre and Private Companies for creation of infrastructure assets in the country.
- It has been associated as nodal agency for Pradhan Mantri Sahaj Bijli Har Ghar Yojana (SAUBHAGAYA), Deen Dayal Upadhaya Gram Jyoti Yojana (DDUGJY) and National Electricity Fund (NEF) Scheme.

Reliance General Insurance Gets Show Cause Notices Worth Rs 922 Crore From GST Authority

Directorate General of GST Intelligence (DGGI)

- **Erstwhile Directorate General of Central Excise Intelligence (DGCEI)**, now renamed as Directorate General of GST Intelligence (DGGI), is an **apex intelligence organization** functioning **under the Central Board of Indirect Taxes & Customs**, Department of Revenue, **Ministry of Finance**.
- It is entrusted with the **task of collection, collation, and dissemination of intelligence relating to the evasion of Goods and Services Tax (GST)** and the **duties of Central Excise and Service Tax** on an all India basis.
- **History:**
 - It was **earlier known as the Directorate General of Anti-Evasion (DGAE)**.
 - **It was established in 1979 as an independent wing** under the control of **Directorate of Revenue Intelligence**, New Delhi with the Regional Units located at Chennai, Delhi, Kolkata and Mumbai.
 - It became a **full-fledged Directorate in 1983**, headed by a Director.
 - **In 1988, the Directorate was upgraded to Directorate General** under a Director General.
 - DGGI has been **expanded since**, and now it comprises **04 offices of Director General** (East, West, North, and South), **26 Zonal Units**, and 40 Regional Units.
- The **main responsibilities** of the DGGI are:
 - **Intelligence gathering:** The DGGI is responsible for gathering intelligence **about potential violations of the GST law**. This includes collecting information from various sources, such as GST returns, financial statements, and other documents.
 - **Investigation:** The DGGI has the power to conduct investigations **into**

suspected cases of GST evasion or non-compliance. This may **involve summoning persons, examining records**, and carrying out searches and seizures.

- **Enforcement:** The DGGI is responsible for enforcing the provisions of the GST law. This **includes taking legal action against offenders, imposing penalties**, and **recovering any taxes** or duties due.
- **Other Functions:**
 - The DGGI **works closely with other agencies**, such as the Central Board of Indirect Taxes and Customs (CBIC) and the State GST authorities, **to ensure effective implementation of the GST law**.
 - It also plays a key role in **creating awareness about GST compliance** and **educating taxpayers** about their obligations under the law.
 - It is also responsible for **providing technical and legal assistance** to field officers and other government agencies involved **in the administration of the GST**.

2023 Economics Nobel Prize

- It has been awarded **to economist Claudia Goldin** for advancing the **understanding of women's labour market outcomes**.
- The Nobel Prize in Economic Sciences is **also known as the Sveriges Riksbank Prize in Economic Sciences**.
- Goldin is **only the third woman to win the prize** since it was **first introduced in 1969**.
- **Her Research:**
 - She provided the **first comprehensive account of women's earnings and labour market participation** through the centuries.
 - Her research **reveals the causes of change** as well as the **main sources of the remaining gender gap**.
 - She showed that **female participation** in the labour market **did not have an upward trend over a 200-year period, but instead forms a U-shaped curve**.
 - The **participation of married women decreased with** the transition from an **agrarian to an industrial society** in the early nineteenth century, **but then started to increase with the growth of the service sector** in the early twentieth century.
 - Goldin explained this pattern as the **result of structural change and evolving social norms regarding women's responsibilities** for home and family.
 - **Historically, much of the gender gap** in earnings could be **explained by differences in education and occupational choices**.
 - However, **Goldin has shown that** the bulk of this **earnings difference is now between men and women in the same occupation**, and that it largely **arises with the birth of the first child**.
 - She **highlighted the role played by marriage, parenthood, and**

contraceptive pills in women's education, career, and salary trajectories.

Unemployment rate declined, says Centre's survey

- The **Labour Force Participation Rate (LFPR)** for persons of age 15 years and above and the **Worker-Population Ratio (WPR)** **improved during the period.**
- The LFPR in **urban areas increased** from 47.5% in April-June 2022 to 48.8% in April-June 2023 for persons of age 15 years and above.
- The **WPR in urban areas increased** from 43.9% in April-June 2022 to 45.5% in similar months in this year for persons of age 15 years and above.
- **For male, it increased** from 68.3% to 69.2% and for female, it increased from 18.9% to 21.1% during this period.

Periodic Labour Force Survey (PLFS)

- Considering the importance of availability of labour force data at more frequent time intervals, **National Statistical Office (NSO) launched Periodic Labour Force Survey in April 2017.**
- **Objective:**
 - To estimate the key employment and **unemployment indicators** (viz. Worker Population Ratio, Labour Force Participation Rate, Unemployment Rate) in the short time **interval of three months** for the urban areas only in the '**Current Weekly Status**' (CWS).
 - To estimate employment and unemployment indicators in both 'Usual Status' (ps+ss) and CWS in both rural and urban areas annually.
- **The indicators of this survey are defined as follows**
 - ****Labour Force Participation Rate (LFPR):**** LFPR is defined as the percentage of persons in labour force (i.e. working or seeking or available for work) in the population.
 - **Worker Population Ratio (WPR):** WPR is defined as the percentage of employed persons in the population.
 - **Unemployment Rate (UR):** UR is defined as the percentage of persons unemployed among the persons in the labour force.
 - **Current Weekly Status (CWS):** The activity status determined on the basis of a reference period of last 7 days preceding the date of survey is known as the current weekly status (CWS) of the person.
- This survey is conducted by the **National Sample Survey (NSO)**, working **under Ministry of statistics and programme implementation (MoSPI).**

Govt tightens PLI rules for white goods

White Goods

- White goods are **large home appliances** such as stoves, **refrigerators, freezers, washing machines**, tumble driers, dishwashers, and **air conditioners**.
- They are **large consumer durables** for the house which were **traditionally available only in white**.
- Even though **you can purchase them today** in a wide range of **different colors**, they **continue being called white goods**.
- White goods are **known for their durability and longevity**, as they are designed to withstand the demands of daily use.
- The term may **also refer to white fabrics, especially linen or cotton** – articles such as curtains, towels, or sheets **that historically used to be made of white cloth**.
- **In the beverage industry, white goods are colorless spirits**, such as vodka or gin.

Brown Goods

- They are **relatively light electronic consumer durables** such as **computers, digital media players**, TVs and radios.
- Unlike large household appliances (white goods), brown goods are **more focused on entertainment, communication, and convenience**.
- These devices **often have electronic components**, and their **primary function is to provide audio, video, or data-related services**.

India ranks 111 out of 125 countries in Global Hunger Index

Global Hunger Index

- It is a tool for **comprehensively measuring** and tracking hunger at **global, regional, and national levels**.
- It is prepared jointly by Irish aid agency **Concern Worldwide** and **German organisation Welt Hunger Hilfe**.
- GHI scores are based on the values of **four component indicators**
 - **Undernourishment**: (the share of the population whose caloric intake is insufficient)
 - **Child stunting**: (the share of children under the age of five who have low height for their age)
 - **Child wasting**: (the share of children under the age of five who have low weight for their height)
 - **Child mortality**: (the share of children who die before their fifth birthday)
- The GHI score is calculated on a **100-point scale** reflecting the severity of hunger, where zero is the best score (no hunger) and 100 is the worst.

Key findings of GHI-2023

- India's ranking is based on a Global Hunger Index **score of 28.7 on a 100-point scale.**
- This categorises India's severity of **hunger as "serious".**
- The 2023 GHI score for **the world is 18.3**, which is considered moderate.
- Latin American and the Caribbean is the only region in the world whose GHI scores have worsened between 2015 and 2023.
- South Asia and Africa South of the Sahara are the world regions with the highest hunger levels, with GHI scores of 27.0 each.

Indian Railways' PSUs, RITES Ltd and IRCON granted Navratna status

Navratna Status

- The **government categorises all** Public Sector Undertakings (PSUs) into **three categories**, namely **Maharatna, Navratna, and Miniratna.**
- **Criteria to grant Navratna status:**
 - To get Navratna status, the PSU **should be a Miniratna-I, Schedule 'A' company**, should have **obtained an 'excellent' or 'very good' MoU rating in three of the last five years**, and must have a **composite score of 60 in six performance indicators.**
 - For a company to achieve Navratna status, **it must report a net profit of more than Rs 5,000 crore for three consecutive years**, and maintain an **average annual turnover of Rs 25,000 crore for three years**, or have an **annual average net worth of over Rs 15,000 crore for three years.**
- Navratna companies can achieve 'Maharatna' status by meeting specific performance benchmarks and fulfilling certain eligibility criteria.
- **How does Navratna status benefit PSUs?**
 - Navratna PSUs have a comparative advantage over other companies as they have been **granted financial independence to invest up to Rs 1,000 crore without seeking approval from the Union government.**
 - **The board** of the 'Navratna' companies **has autonomy to incur capital expenditure on the purchase of new items** or for replacement **without any monetary ceiling** and to **enter into technology joint ventures** or strategic alliances, among others.
 - The status gives the **Board of Directors** of these CPSEs the **power to allow mergers and acquisitions in India and abroad.**
 - However, they **need an approval from the Cabinet Committee on Economic Affairs (CCEA) to make investments abroad.**
 - The **Chief Executive of the PSE gets the power to approve business tours abroad of functional directors** up to five days' duration (other than study tours, seminars, etc) **in emergencies**, under intimation to the Secretary of the administrative ministry.

Sigachi Industries Initiates 10:1 Stock Split

Stock Split

- A stock split **happens when a company increases the number of its shares** to boost the stock's liquidity.
- It is a corporate action in which a company **issues additional shares to shareholders, increasing the total by the specified ratio** based on the shares they held previously.
- Although the **number of shares outstanding increases**, there is **no change to the company's total market capitalization** as the **price of each share will split as well**.
- The most **common split ratios are 2-for-1 or 3-for-1** (sometimes denoted as 2:1 or 3:1). This means that **for every share held before the split, each stockholder will have two or three shares, respectively, after the split**.
- The **number of shares increases**, but the **price per share goes down in proportion**.
- **Why is a stock split done?**
 - It is done to **infuse liquidity** and to **make shares affordable** for various investors who could not buy the shares of that company before due to high prices.
 - It is sometimes **aimed at helping a company meet the minimum requirements to remain listed** on an exchange. This is **because some stock indexes are price-weighted**, meaning a company wishing to join the index would need to have, among other criteria, a price that falls within a certain band.
- **What is a Reverse Stock Split?**
 - It is the opposite transaction, in which a **company lowers, instead of increasing, the number of shares outstanding, raising the share price accordingly**.
 - The **total value** of your shares **would remain consistent**.

SEBI Approached OCCRP for Documents on Adani Allegations

Organized Crime and Corruption Reporting Project (OCCRP)

- OCCRP is a **nonprofit investigative reporting platform for 50+ independent media outlets** around the world, **publishing more than 100 investigations a year**.
- It was **founded in 2006 to conduct transnational investigative reporting** and promote technology-based approaches **to exposing organised crime and corruption worldwide**.
- It **aims to develop and equip a global network of investigative journalists and publish their stories**.
- With this, OCCRP **exposes crime and corruption** so the public can hold

power to account.

- **Vision:** "A world where lives, livelihoods, and democracy are not threatened by crime and corruption."
- OCCRP **provides media outlets and journalists with a range of critical resources and tools**, including digital and physical security, **and allows those covering** the most **sensitive topics to work in teams with trusted editors.**
- **OCCRP Aleph:** It is **an investigative data platform** where journalists can **search and cross-reference** more than **three billion records to trace criminal connections** and patterns and **efficiently collaborate across borders.**
- It **also trains reporters** and partners in **advanced journalism techniques.**
- OCCRP **also partners with advocacy groups**, arming civil society with information to meaningfully press for justice and change and **unearths evidence that enables law enforcement to act.**

BSE increases transaction charges on the derivative segment from November 1

Bombay Stock Exchange (BSE)

- It is the **oldest and largest stock exchange** in India.
- It was **established in 1875** as the **Native Share and Stock Brokers' Association.**
- **In 1957**, the **Indian Government gave recognition to the BSE** under the Securities Contracts Regulations Act.
- It is **located on Dalal Street, Mumbai**, and lists over **6000 companies.**
- BSE boasts a **variety of trading options in equity, fiat, debt instruments, derivatives, and mutual funds.**
- In addition, it offers multiple trading **services like clearing, settlement, risk management, and investor awareness.**
- **How does the BSE work?**
 - The BSE **employs** an advanced, electronically managed **trading portal to facilitate financial trades.**
 - The exchange **allows shareholders to place orders online** without requiring external help from industry experts.
 - This process is possible through the **direct BSE market access offered by the portal.**
 - Investors can trade on the BSE share market **via a brokerage firm** For this, they **need to pay a pre-determined price to the broker.**
 - The **direct investment option is only for** a section of **investors with bulky BSE transactions to their credit.**
 - The BSE stock exchange **has the Bombay Online Trading Platform (BOLT)** to ensure a safe trading experience.
 - The BSE Sensex stocks **follow a T+2 transaction settlement scheme** which implies that **each transaction on the exchange takes two**

days to complete processing.

- BSE market **complies with the regulatory guidelines imposed by SEBI** to ensure investors' safety and capital market efficiency.

Sensex

- Sensex is the **benchmark index of the BSE.**
- It was **launched on January 1, 1986**, as a **basket of 30 stocks** representing the country's **largest, financially-sound companies** listed on the BSE.
- The term 'Sensex' is a blend of words 'Sensitive' and 'Index' and was **coined by stock market expert Deepak Mohini.**
- The Sensex **reflects the movements in the Indian stock market.** It is considered the benchmark index of the Indian stock market.
- **How is the Sensex calculated?**
 - It was calculated **based on the market capitalisation**, or "Full Market Capitalisation", **when it was launched** but **shifted to a "Free-float Market Capitalisation"** methodology **from September 1, 2003.**
 - **Free-float is the proportion of total shares** issued by the company that is **readily available for trading to the general public.** It **does not take into account promoters' holdings, government holdings,** and other shares that will not be available in the market for trading in the ordinary course of events.

Derivatives

- A derivative is a **contract between two parties** which **derives its value/price from an underlying asset.**
- The commonly used **assets are stocks, bonds, currencies, commodities and market indices.**
- These instruments **allow investors and traders to speculate on the price movements of the underlying asset without owning it** directly.
- The **value of the underlying assets keeps changing** according to market conditions. The **basic principle** behind entering into derivative contracts **is to earn profits by speculating on the value of the underlying asset in future.**
- Derivatives serve various **purposes, including hedging against risks, providing leverage,** and facilitating price discovery.

SC clarifies companies can't claim lower withholding tax under tax treaties without notification

Withholding Tax

- Withholding tax **is withheld or deducted from certain types of income**, such as wages, dividends, interest, and royalties, **when they are paid to the recipient (non-resident individual).**
- It is also **known as Retention tax.**

- The purpose of withholding tax in India is to **ensure that the government receives a portion of the income tax** owed by the recipient.
- Withholding tax is **applicable in the case of payments made to non-resident individuals.**
- **If the income is paid in India, the person responsible for payments to NRI must deduct the withholding tax at the time of payment** or when the amount is credited to the NRI's account, **according to Section 195 of the Income Tax Act.**
- **The amount** of withholding tax in India **depends on the type of income, the amount of income earned, and the tax laws of the country where the income is earned.**
- The **tax rate** is decided **as prescribed in the Income Tax Act, 1961, or Double Taxation Avoidance Agreement (DTAA), whichever is lower.**
- The **central government** of India **collects this tax.**
- India has **signed DTAA's with many countries to avoid taxing individuals twice** for the same income (in India and the partner country). Currently, India has DTAA treaties with more than 80 countries around the world.
- **How to determine tax liability for withholding tax?**
 - To calculate tax liability, it is **important to know the residential status** of any person: "Resident Indian" and "Non-Resident Indian".
 - An individual is **considered to be a resident in India for tax purposes** if he or she satisfies any of the following conditions:
 - **Stays in India for 182 days or more during the financial year, or**
 - **Stays in India for 60 days or more during the financial year and for 365 days or more during the 4 years immediately preceding the financial year.**
 - If an **individual does not meet** either of **these conditions**, he or she will be **considered a non-resident** for tax purposes.
 - **Income earned or received in India:**
 - If an **individual is a resident** of India for tax purposes, he or she **will be taxed on his or her global income, including income earned or received in India and outside India.**
 - If an **individual is a non-resident** of India for tax purposes, he or she **will be taxed only on the income earned or received in India.**
 - **Citizenship or place of birth:**
 - Citizenship or place of birth is **not a determining factor for residential status for tax purposes** in India.
 - An individual **may be a citizen of India** or born in India **but may still be considered a non-resident** for tax purposes **if he or she does not meet the criteria** outlined above.

Difference between Withholding Tax and TDS?

- **Withholding Tax:** It is the amount that is **deducted in advance**, and the same is **deposited with the government before the amount is paid** to the

payer. It is generally **applicable on payments to non – residents**, that are foreign transactions.

- **TDS (Tax Deducted at Source):** A person (**deductor**) who is required to **make a payment** of a specific nature to another person (deductee) **must deduct tax at source** and ****send it to the Central Government's account**. It is **applicable on specified transactions under the income tax act, 1961 to both resident and non-resident**.
- Both withholding tax and TDS **serve the same purpose:** to ensure that **taxes are collected at the source** of income. They are used to **ensure tax compliance and prevent tax evasion**.

INTERNATIONAL RELATIONS

UK gives BAE 4 billion pound contract for AUKUS submarine programme

AUKUS

- **Established in 2021**, the AUKUS is intended to be a **strategic partnership among Australia, the United Kingdom (UK), and the United States** to bolster their allied deterrence and defense capabilities in the Indo-Pacific.
- The trilateral partnership, which **builds on their decades-long security cooperation, has two pillars.**
 - **Pillar I** revolves around the **acquisition and development of conventionally armed nuclear-powered submarines for the Royal Australian Navy;**
 - **Pillar II** calls for **collaboration on advanced capabilities** that will involve **technology and information sharing;**

Submarine component

- It is designed to **equip Australia with nuclear-powered attack submarines (SSNs).**
- In total, **Australia will end up with eight of the new nuclear submarines, called SSN-AUKUS.**
- Those submarines will be **based on a British design** but **have American technology** or an American combat system.
- The **deal marks the first time the US has shared nuclear propulsion technology with an ally other than the UK.**
- It will significantly **enhance Australia's undersea capabilities in the Indo-Pacific.**
- These countries, however, made it clear that their **aim is not to arm the new submarines with nuclear weapons.** This is **because Australia is a signatory to the Nuclear Non-proliferation Treaty (NPT)**, which bans it from acquiring or deploying nuclear weapons.

UNCTAD calls for bold global action to decarbonise shipping

- Overall, the shipping **industry contributes to over 80 percent** of the world's trade volume and nearly **three percent** of global greenhouse gas emissions.
- **Containerised trade**, which **had declined by 3.7 per cent in 2022**, is expected to grow by 1.2 per cent in 2023 and grow further by three per cent between 2024-2028.
- Oil and gas trade volumes showed robust growth in 2022, while tanker freight rates saw a strong revival driven by geopolitical events.

United Nations Conference on Trade and Development (UNCTAD)

- It is the UN's leading institution **dealing with trade and development.**
- It is a **permanent intergovernmental** body established by the United Nations General Assembly in 1964.
- It supports developing countries to access the benefits of a **globalised economy more fairly and effectively.**
- It provides economic and trade analysis, facilitates consensus-building and offers technical assistance to help developing countries use trade, investment, finance, and technology for inclusive and sustainable development.
- **Headquarter:** Geneva, Switzerland.
- **Reports published by the UNCTAD**
 - Trade and Development Report
 - World Investment Report
 - The Least Developed Countries Report

India expresses commitment towards combating organised crimes at UNTOC

United Nations Convention against Transnational Organised Crime

- It is a multinational treaty against transnational organized crime that **was established by the United Nations in 2000.**
- It is often known as the **Palermo Convention.**
- The UNTOC has a total of **147 signatories and 190 parties** to the convention.
- The Convention is further supplemented **by three Protocols**
 - The Protocol to Prevent, Suppress and **Punish Trafficking in Persons, Especially Women and Children;**
 - The Protocol against the **Smuggling of Migrants by Land, Sea and Air;** and
 - The Protocol against the **Illicit Manufacturing of and Trafficking in Firearms,** their Parts and Components and Ammunition.
- **India signed** the UN Convention against Transnational Organized Crime (UNTOC) and its three Protocols on **December 12, 2002.**
- **The Central Bureau of Investigation (CBI)** is the nodal agency for all dealings with UNTOC.

India Re-elected as President of Asia-Pacific Institute for Broadcasting Development (AIBD) for a Third Successive Term

Asia-Pacific Institute for Broadcasting Development

- It was established in 1977 under **the auspices of UNESCO.**
- The AIBD currently has **92 member organisations** from across 44 countries,

including 26 government members (countries) represented by 48 broadcasting authorities and broadcasters.

- It also has 44 affiliates (organisations) represented by 28 countries and **regions in Asia, Pacific, Europe, Africa, Arab States and North America.**
- **India is** one of the **founding members** of this organization.
- The **Prasar Bharati**, India's public service broadcaster, is the **representative body** of the Ministry of Information & Broadcasting, Government of India, at AIBD.

Prasar Bharati

- It is the Public Service Broadcaster of the country.
- It is a **statutory autonomous body** established in 1997 under the Prasar Bharati Act.
- **Objective:** To conduct public broadcasting services intended to inform and entertain the public.
- It comprises the Doordarshan Television Network and All India Radio, which were earlier media units of the Ministry of Information and Broadcasting.
- **Headquarter:** New Delhi

Tanzania to join Big Cat and Global Biofuels Alliances after President Suluhu's meet with PM Modi

International Big Cat Alliance (IBCA)

- It was **launched by India** on **April 9, 2023**, for the **conservation of seven big cats**, namely **Tiger, Lion, Leopard, Snow Leopard, Cheetah, Jaguar, and Puma** harbouring our planet.
- Membership: It is **open to 97 'range' countries**, which contain the **natural habitat of these big cats**, as well as other interested nations, international organizations, etc.
- It will provide a **platform for the member nations to share knowledge and expertise** and **extend support to recovery efforts** in potential habitats.
- Its major activities will include **advocacy**, partnership**, knowledge e-portal**, capacity **building**, **eco-tourism**, partnerships between expert groups, and finance tapping.
- IBCA will also **assist existing species-specific inter-governmental platforms** to boost conservation efforts.
- **Funding: After the first five years**, which will be **supported by India's 'total grant assistance' of \$100 million**, the **IBCA is expected to sustain itself through membership fees and contributions** from bilateral and multilateral institutions and the private sector.
- **Governance Structure:**
 - A **General Assembly** consisting of all member countries.
 - A **Council of at least seven but not more than 15** member countries **elected by the General Assembly for a term of 5 years**, and a

Secretariat.

- Upon the recommendation of the Council, the **General Assembly will appoint the IBCA Secretary General** for a specific term.

Sri Lanka to take over as Chair of Indian Ocean Rim Association

Indian Ocean Rim Association

- It was **established in 1997** as an **intergovernmental organisation** of States on the rim of the Indian Ocean.
- **Member countries:**
 - It has members from **Africa, West Asia, South Asia, Southeast Asia**, Europe and Oceania.
 - The Association's membership has expanded to **23 member states** and 11 dialogue partners.
 - **Asia:** India, Bangladesh, Indonesia, Iran, Malaysia, Maldives, Oman, Singapore, Sri Lanka, Thailand, United Arab Emirates and Yemen.
 - **Africa:** Kenya, Madagascar, Mozambique, Somalia, South Africa, Tanzania, Comoros, Mauritius, Seychelles.
 - **Oceania:** Australia.
 - **Europe:** France
- Its apex body is the **Council of Foreign Ministers (COM)** which **meets annually**.
- IORA has identified **six priority areas** namely: Trade and Investment, Maritime Safety and Security, Fisheries Management, Disaster Risk Management and Blue Economy.
- The **secretariat is based in Ebène Mauritius** and is overseen by a **secretary-general** who is appointed for a **three-year period**.

Vice President Jagdeep Dhankhar interacts with President of Inter-Parliamentary Union on P20 sidelines

Inter-Parliamentary Union (IPU)

- IPU is the **international organization of Parliaments**.
- I was **established in 1889 in Paris** to **promote representative democracy** and **world peace**.
- The IPU **facilitates parliamentary diplomacy** and empowers parliaments and parliamentarians to **promote peace, democracy, and sustainable development** around the world.
- It was the **first multilateral political organization** in the world, **encouraging** cooperation and **dialogue between all nations**.
- **Slogan: "For democracy. For everyone"**
- Today, the IPU comprises **179 member parliaments** and **13 associate**

members.

- It promotes democracy and **helps parliaments become stronger, younger, gender-balanced**, and more diverse.
- It also **defends the human rights of parliamentarians** through a dedicated committee made up of MPs from around the world.
- The IPU moved its **headquarters to Geneva** in 1921.
- **Funding:** The IPU is financed **primarily by its members out of public funds.**
- **Structure:**
 - **IPU Assembly:**
 - It is the **principal statutory body** that **expresses the views of the IPU** on political issues.
 - It **brings together parliamentarians to study international problems** and **make recommendations** for action.
 - **Governing Council:**
 - It is the **plenary policymaking body** of the IPU.
 - It is **composed of three representatives from each member parliament.**
 - The **President of the IPU is ex-officio President** of the Governing Council.
 - The Council **establishes the annual programme and budget** of the IPU.
 - Occasionally, the Council **considers substantive issues** and **adopts thematic resolutions and policy statements.**
 - A number of **committees and working groups are subordinated to it** and report to the Council on their work.
 - **Executive Committees:**
 - In accordance with the IPU statutes, this **17-member body oversees the administration of the IPU** and provides **advice to the Governing Council.**
 - The **15 members** of the Executive Committee **are elected by the Council for a four-year term.**
 - The **President of the IPU is an ex officio member and President** of the Committee.
 - **Standing Committees:** There are **three Standing Committees** set up by the IPU Governing Council to assist the Assembly in its work.
 - **Meeting of Women Parliamentarians:**
 - It is a **separate organ** of the IPU, which **meets on the occasion of the first round of Statutory Meetings of the IPU** and reports on its work to the Governing Council.
 - The meeting can be **attended by the parliamentarians of both sexes.**
 - **The agenda** of the meeting **includes one but not more than two substantive items** for debate, which **may relate to the competence of the Assembly.**

ENVIRONMENT

Genome-wide study of staghorn coral identified

Staghorn coral

- It is one of the most important **corals in the Caribbean**.
- It, along with elkhorn coral and star corals built Caribbean coral reefs over the last 5,000 years.
- Staghorn coral can form dense groups **called “thickets” in very shallow water**.
- These provide important habitat for other reef animals, especially fish.
- **Appearance**
 - Staghorn coral colonies are golden **tan or pale brown with white tips** and they get their color from the algae that live within their tissue.
 - These corals have antler-like branches and typically stem out from a central trunk and angle upward.
 - Each staghorn coral colony is made up **of many individual polyps** that grow together.
 - These coral get food **from photosynthetic algae that live inside the coral's cells**. They also feed by capturing plankton with their polyps' tentacles.
- **Distribution:**
 - It is found typically in clear, shallow water (15–60 feet) on coral reefs throughout **the Bahamas, Florida, and the Caribbean**.
 - The northern extent of **the range in the Atlantic Ocean** is Palm Beach County, Florida, where it is relatively rare.
 - They live in many coral reef habitats **including spur and groove, bank reef, patch reef, and transitional reef habitats**, as well as on limestone ridges, terraces, and hard bottom habitats.
- **Lifespan & Reproduction**
 - These coral reaches reproductive maturity at about 7 inches tall.
 - Staghorn coral is a **simultaneous hermaphrodite**, meaning each colony produces both eggs and sperm, but usually does not self-fertilize.
 - This coral **sexually reproduces once per year** after the full moon in late summer by “broadcast spawning” eggs and sperm into the water column.
 - Fertilized eggs develop into larvae that settle on hard surfaces and form new colonies.
- **Threats**
 - Climate change
 - **Diseases:** It is particularly susceptible to **white band and white plague**
 - Unsustainable Fishing Pressure

What is White band disease?

- It is a common **tissue loss disease**.
- Studies suggest that white band disease is caused by a communicable agent, however, a specific pathogen has not yet been definitively identified.

18 more pygmy hogs return to Manas National Park

Pygmy hog

- It is the **smallest and rarest species** of wild pig in the world.
- It is one of the very few mammals that build its own home, or nest, complete with a 'roof'.
- It is an **indicator species** as its presence reflects the health of its primary habitat, tall and wet grasslands.
- **Habitat:** It prefers undisturbed patches of grassland dominated by early succession riverine communities, typically comprising dense tall grass intermixed with a wide variety of herbs, shrubs and young trees.
- Currently, the viable population of this pig in the wild is in **the Manas Tiger Reserve** in Assam.
- **Conservation status:**
 - **IUCN:** Critically Endangered
 - **The Wildlife Protection Act, 1972:** Schedule I

Manas National Park

- It is located in the **state of Assam**. It is contiguous with the Royal Manas National Park in Bhutan.
- It is a **national park, UNESCO Natural World Heritage site, a Project Tiger reserve**, an elephant reserve and a biosphere reserve.
- **Flora:** It contains some of the largest remaining grassland habitats in the sub-Himalayan grassland ecosystems.
- **Fauna:** The Park is known for its rare and endangered endemic wildlife such as the Assam roofed turtle, hispid hare, golden langur and pygmy hog.
- The **Manas River** is a major tributary of Brahmaputra River, which **passes through the Manas National Park**.

Mundanthurai Tiger Reserve to protect flora, fauna

Kalakkad-Mundanthurai Tiger Reserve

- **Location:** It is located in the **Southern Western Ghats** in the Tirunelveli and Kanyakumari districts of **Tamil Nadu**.
- It was established as a **Tiger Reserve in 1988**.

- This reserve is a **mixture of three main sanctuaries: Kalakad Sanctuary, Mundanthurai Sanctuary, and a part of Kanyakumari Sanctuary.**
- **Nestled between Kerala and Tamil Nadu, the Agastya Malai Hill Range forms the core area of the sanctuary and is part of one of the world's 18 biodiversity hotspots.**
- The reserve is **also known as the "River Sanctuary"**, with as many as **14 rivers originating from this Tiger Reserve.**
- **Terrain: Undulating with several valleys and porous rocks.**
- **Vegetation:**
 - It varies from **thorny shrub jungles to lush evergreen forests.**
 - In addition to **forests, savannah woodlands, and grasslands, there are tea and coffee plantations within the reserve.**
- **Flora:** Important species include **Sarcandra, Paphiopedulum, druryi, Hopea parviflora, Hopea utilis, Calophyllum elatum, Cullenia exarillata, etc.**
- **Fauna: Tiger, leopard, rusty spotted cat, wild dog, sloth bear, elephant, gaur, sambar, spotted deer, mouse deer, nilgiri langur, slender loris, bonnet macaque, lion tailed macaque, etc.**

Newly discovered fish can change its colour like a chameleon

Badis limaakumi

- It is a **new badis fish species discovered in Nagaland.**
- It is **locally known by many names, like "Tepdang" or "Akngashi (Chungli)" or "Aokngatsü (Mongsen)" or "Sempi" etc.**
- It **appears black in its natural habitat** but undergoes a remarkable **color change when placed in an aquarium** or different environments.
- **Features:**
 - It has a **comparatively large and slender body.**
 - **Absence of blotches on the sides and fins, as well as on the cleithrum.**
 - **Large number of lateral-line scales.**

Badis species

- It is a genus of small **freshwater fish belonging to the family Badidae.**
- Fish from the Badis species are **also called Chameleon fish due to their ability to change colour** rapidly when breeding, when wanting to blend into their surroundings, or when stressed.
- **Distribution:** They are **found in freshwater bodies** like rivers, ponds, and marshes **in northern India, eastern Pakistan, Bangladesh, Bhutan, and Nepal,** including the Ganges, Brahmaputra, Mahanadi, and Indus basins.
- Currently, there are about **25 recognized badis species, out of which 15 have been reported from India.**
- They are **predatory in nature, feeding on tiny freshwater invertebrates.**

Indian scientists discover active submarine volcano in Andaman sea

Seamount

- It is an **underwater mountain formed** through volcanic activity.
- These are recognised as hotspots for marine life. Like volcanoes on land, seamounts can **be active, extinct, or dormant volcanoes.**
- These are **formed near mid-ocean ridges**, where the earth's tectonic plates are moving apart, allowing molten rock to rise to the seafloor.
- The planet's two most-studied mid-ocean ridges are the Mid-Atlantic Ridge and the East Pacific Rise.
- Some seamounts have **also been found near intraplate hotspots**—regions of heavy volcanic activity within a plate—and oceanic island chains with volcanic and seismic activity called island arcs.
- These are formed when molten rock comes up from below the tectonic plate.
- **Significance of seamounts**
 - They **provide information** about the **mantle's composition** and how tectonic plates evolve.
 - These are helpful in **understanding their influence on how water** circulates and absorbs heat and carbon dioxide.
 - They are good places for life because they can cause **localised ocean upwelling**, the process by which nutrient-rich water from deep within the ocean moves up to the surface.

Andaman Sea

- It is a marginal sea in the **northeastern Indian Ocean.**
- It is bound
 - To the north, by the **Irrawaddy River delta of Myanmar**(Burma)
 - To the east are peninsular Myanmar, Thailand, and Malaysia.
 - To the south is the Indonesian island of Sumatra and the Strait of Malacca, and to the west are the Andaman and Nicobar Islands, which constitute a union territory of India.

Bihar to get second tiger reserve in Kaimur district

Kaimur Wildlife Sanctuary

- It is the largest sanctuary located in **the Kaimur District of Bihar.**
- It is nestled in the **Vindhayachal hill ranges.**
- The sanctuary forms a very important catchment **for the Kav, Sone, and Durgawati river systems**, with important tributaries.
- It is connected **with Chandraprabha Wildlife Sanctuary of UP**, which again has links with **Sanjay Dubri Tiger Reserve and Panna landscape** in Madhya Pradesh through stepping stone forests of Marihan, Sukrit, Chunar ranges

and wildlife sanctuaries of Ranipur (UP).

- **Vegetation:** This region has a thick covering of **mosaic prairie, tropical dry deciduous** backwoods, and swampy bogs.
- **Fauna:** The main animals found are Bengal tigers, Indian leopards, Indian boars, sloth bears, sambar deers, chitals, four-horned antelope and nilgais.
- **Flora:** The plants found here include Salai (BoswelliaSerrata), Siddha, Indian Rosewood (Sheesham), Jamun, Teak, Koraiya, Saal, and Jheengarare some species of plant life.

Countries pledge to raise \$12 billion to fund coral reef protection

International Coral Reef Initiative:

- It was launched in 1994 by Australia, France, Japan, Jamaica, the Philippines, Sweden, Britain and the United States.
- Its **members now include 45 countries** that represent three quarters of the world's coral reefs.
- **India is** also a **member country** of this initiative.
- It is a global **partnership between Nations and organizations** which strives to preserve coral reefs and related ecosystems around the world.
- Its decisions are **not binding on its members**.
- The work of ICRI is regularly **acknowledged in United Nations documents**, highlighting the Initiative's important cooperation, collaboration and advocacy role within the international arena.
- **Objectives**
 - Encourage the **adoption of best practice in sustainable management** of coral reefs and associated ecosystems
 - Build capacity
 - Raise **awareness at all levels** on the plight of coral reefs around the world.

Corals

- Corals are **marine invertebrates** or animals which do not possess a spine. They are the largest living structures on the planet.
- Each **coral is called a polyp** and thousands of such polyps live together to form a colony, which grows when polyps multiply to make copies of themselves.
- They live in a **sympiotic relationship with microscopic algae** called zooxanthellae (which live within the coral tissue).
- The **zooxanthellae** convert sunlight into food, providing corals with up to 90 per cent of their energy needs.

The Nilgiris' endemic tarantula could be under threat from habitat loss and

climate change, say researchers

Haploclastus nilgirinus

- It is an elusive **Nilgiri large burrowing spider** and a venomous species of tarantula.
- It is endemic to the Nilgiris hills of **Western Ghats**.
- It shows sexual dimorphism, the males are much smaller than the females.
- **Threats:** It is threatened by the illegal trade in wildlife as well as by climate change,

Tarantula

- Tarantulas are a **type of large, hairy spider** belonging to the family Theraphosidae.
- There are over 900 species of tarantulas found all over the world, except for Antarctica.
- They move slowly on their eight hairy legs, but they are accomplished nocturnal predators.
- Adult tarantulas average five inches (13 centimeters) long. When spread out, their leg span is up to 11 inches (28 centimeters).

Nilgiri Hills

- These hills are part of the **Western Ghat mountain** range and run across the Southern Indian states of Tamil Nadu, Karnataka and Kerala.
- The peaks of the Nilgiri rise abruptly from the surrounding plains to an elevation of about 6,000–8,000 feet one of them, **Doda Betta** (8,652 feet) is the highest point in Tamil Nadu.
- The hills are separated from the **Karnataka Plateau** (north) by the **Noyar River** and from the Annamalai and Palni hills (south) by the Palghat Gap.
- They are considerably cooler and wetter than the surrounding plains, the upper hills forming undulating grassy downs.

Govt. to prepare inventory of land use adjacent to Kolleru wildlife sanctuary

Kolleru Wildlife Sanctuary:

- **Location:** It is a significant **wetland sanctuary** located in the **West Godavari and Krishna districts** of the Indian state of **Andhra Pradesh**.
- It was **established in November 1999**, under the Wildlife Protection Act of 1972.
- The sanctuary **protects part of the Kolleru Lake wetland**, which gained Ramsar Convention for International importance in 2002.
- It is a crucial **wetland ecosystem** and serves as a **stopover point for migratory birds**.

- **Flora:** The sanctuary's flora includes various **aquatic plants, submerged macrophytes**, and **wetland vegetation** that provide essential food and shelter for the diverse bird species.
- **Fauna:** Commonly found birds in the sanctuary are: **little egret, cattle egret, pied kingfisher, small blue kingfisher**, blackcapped kingfisher, pond heron, reef heron, grey heron, night heron, etc.

Kolleru Lake

- It is the **largest freshwater lake** in India.
- It is located in **Andhra Pradesh between the Krishna and Godavari deltas** and covers an area of 308 km².
- The lake serves as a **natural flood-balancing reservoir** for these two rivers.
- The lake is **fed directly by water from the seasonal Budameru and Tammileru streams**, and is connected to the Krishna and Godavari systems by over 68 inflowing drains and channels.
- It serves as a **habitat for migratory birds**.
- The lake was **notified as a wildlife sanctuary in November 1999** under India's Wild Life (Protection) Act, 1972, and **designated a wetland of international importance in November 2002 under the international Ramsar Convention**.

New dragonfly species discovered in Wayanad

Epithemis wayanadensis

- It is also known as **Red-rumped Hawklet**.
- It starts flying exclusively during **the month of October**.
- This species was found amidst the foliage of shrubs flourishing along a shaded streamside marsh **near Wayanad's forested terrain**, as well as parts of the Nilgiri Coorg landscapes within the **Western Ghats**.
- **Appearance:** This newfound species is distinguished by its darker pigmentation, a **restricted red coloration on the abdomen**, and the absence of the yellow antehumeral stripe.
- This is the first instance of an Indian dragonfly being documented with **genetic evidence** substantiating morphological distinctions.

Western Ghats

- It is also called as Sahyadri, north-south-running range of mountains in western India.
- It forms the crest of the **western edge of the Deccan plateau** parallel to the Malabar Coast of the Arabian Sea.
- The Western Ghats are a biodiversity hot spot, a biologically rich but threatened region, and a **UNESCO World Heritage site**.

- They play a huge role in India's monsoon weather pattern.

NGT seeks report on removal of invasive mussel species from Ennore-Pulicat wetland

Mytella strigata

- It is a moderately large and **symmetrical shelled mussel**.
- It is generally observed in the **middle intertidal and subtidal waters** of estuaries and near coastal environments.
- These mussels attach themselves to surfaces using byssus threads.
- **Appearance:**
- Individual mussels have a **diversity of external colour** schemes from black, dark bluish, brown, grey, orange and (rarely) green
- The species can also have a range of external shell patterns from zig zags, spots or concentric bands.
- It can form dense clusters that colonise hard substrates or occupy epibenthic habitats, including other mussel species.
- It is usually present on both **the Atlantic and Pacific coasts of tropical South and Central America**.
- It has spread to Taiwan, the Philippines, Singapore, the Gulf of Thailand, west coast of India and the south-eastern United States.
- **Threats:** These mussels spread like a carpet over the river bottoms and thus preventing prawns from grazing or burying themselves in the sediment.

Surkhab birds arrive at Uttarakhand for winter stay

Ruddy Shelduk

- It (*Tadorna ferruginea*) belongs to the **family Anatidae** under the order Anseriformes.
- In India it is known as the **Brahminy duck**.
- It is **distributed in Europe, Asia, Indian Subcontinent** and a few pockets in Africa. These ducks are migratory birds.
- They winter in the Indian Subcontinent, South India and Southeast Asia.
- They inhabit large **wetlands, salt lakes, crater lakes, rivers** with mud flats and shingle banks.
- It is a mainly **nocturnal bird**.
- It is **omnivorous** and feeds on grasses, the young shoots of plants, grain and water plants as well as both aquatic and terrestrial invertebrates.
- They are no sitting ducks; they **scale the mighty Himalayas** when flying to India from the north attaining heights of 6,800 metres.
- **Conservation status**

- **IUCN** : Least Concern

Scientists discover massive long-necked dinosaur 'titan' in Spain

Garumbatitan morellensis

- It was a **Titanosaur species**, which is a **subgroup of sauropods**.
- It was the only lineage to survive until the dinosaur-killing asteroid struck around 66 million years ago.
- These massive fossils, as per estimates, date back to the Lower Cretaceous period (some 145 to 66 million years ago).
- These titans belonged to the sub-group Somphospondyli.

Titanosaur species

- They lived from the Late Jurassic Epoch (163.5 million to 145 million years ago) to the end of the Cretaceous Period (145 million to 66 million years ago).
- Titanosaur **fossils have been found on all continents except Antarctica** and include some 40 species.
- The group contains the largest terrestrial animals known, some even approaching the size of modern whales.
- Like other sauropods, titanosaurs were **herbivorous quadrupeds** with long tails, long necks, and small heads.
- Their bodies were stockier and their limbs produced a wider stance than other sauropods.
- They also **possessed vertebrae with** a honeycomb-like internal structure and six sacral vertebrae

Mont Blanc's mighty height shrinks by over 2 metres

Mont Blanc

- It is the highest peak (4,807 metres) in **Europe**.
- It is **located in the Alps** and lies along the French-Italian border and reaches into Switzerland.
- It is nicknamed as "**the roof of Europe**".
- Its name comes from the perennial snow cap that covers it, meaning literally "**the white mountain**".
- The mountain stands in a **range called the Graian Alps**, between the regions of Aosta Valley, Italy, and Savoie and Haute-Savoie, France.

Alps

- The Alps emerged during **the Alpine orogeny** an event that began about 65

million years ago as **the Mesozoic Era** was drawing to a close.

- They are **young fold mountains** with rugged relief and high conical peaks.
- The Alps arose as a **result of the collision of the African and Eurasian tectonic plates** in which the Alpine Tethys which was formerly in between these continents disappeared.
- The Alps extend north from the **subtropical Mediterranean** coast near Nice, France, to Lake Geneva before trending east-northeast to Vienna (at the Vienna Woods).
- There they touch the Danube River and meld with the adjacent plain.
- The Alps form part of France, Italy, Switzerland, Germany, Austria, Slovenia, Croatia, Bosnia and Herzegovina, Montenegro, Serbia, and Albania.

Indonesia reports a new Javan rhino calf, but population doubts persist

Javan Rhino

- The Javan rhino, also known as the **lesser-one-horned rhino**, is the **most threatened of the five rhino species**.
- **Scientific Name: Rhinoceros sondaicus**
- **Distribution:**
 - They **once lived throughout northeast India and Southeast Asia**.
 - **Today, the entire population of the Javan rhinos is found in the Ujung Kulon National Park** on the very western tip of **Java, Indonesia**.
- **Habitat:** They inhabit **forests, marshy areas, and regions of thick bush and bamboo**.
- **Population:** In 2020, park managers, relying on camera trap data to identify and track the animals, estimated that no more than **68-74 surviving individuals** remained.
- **Features:**
 - It is a **smaller and lighter relative of the greater one-horned rhino**. They can reach a **height of 1.7 m (5.6 ft)** and **weigh up to 2,300 kg (5,070 lb)**.
 - They have **grey or grey-brown skin**, almost **black when wet**, with **pink colouring in the folds**.
 - Similar to the Indian rhino, the **Javan rhinoceros has a single horn**, unlike the other three species of rhinos, which have two.
 - It has the **smallest of horns for all species** of rhinoceros measuring less than **20 cm (7.9 in) in length**.
 - **Lifespan: 30 to 45 years** in the wild.
 - They're **herbivorous**, only eating plants.
 - They're **solitary animals**, except for mating pairs and mothers with young.
- **Conservation Status:**

- **IUCN Red List: Critically Endangered**

Dancing frogs of Western Ghats among most threatened amphibians globally

Dancing frogs

- These are **endemic to the Western Ghats**.
- **Habitat:** The species was found to prefer habitats in areas with thick canopy cover of at least 70-80 per cent
- It belongs to the **Micrixalus genus**.
- It is also the fifth most threatened genus in the world with 92 per cent of its species in the threatened category
- **Behaviour**
 - The dancing frogs that are found near the streams do a unique display to mate.
 - The **males stretch up their hind legs** one at a time and wave their webbed toes in the air in a rapid motion akin to a dance.
 - This is to **attract mates as well as ward off competition**, probably preferred because their mating calls are drowned out by the gurgling of the streams.
 - This act is called "**foot flagging**" and gives the species their name.
- **Ecological significance:**
 - Frogs are valuable in the food chain and also provide other ecological services.
- **Threats:** These species are threatened by **invasive species** like the mosquito fish, land use change, variation in **temperature and humidity**, extreme **weather events** such as floods and excess rainfall, **infectious diseases**, water pollution, light pollution, and infrastructure projects.

Arctic puffins evolved into a new species 6 generations ago, but they might be less fit to survive, a new study shows

Atlantic Puffin

- It is a species of **small seabird in the auk family**.
- It's the **only puffin species found in the Atlantic Ocean**.
- **Scientific Name: Fratercula arctica**
- **Habitat:** It is found on **rocky coasts in the Northern Atlantic Ocean during the breeding season** and on the **open ocean in the non-breeding season**.
- **Geographical Range:**
 - It is a **migratory species, spending most of the time traveling back and forth across the Atlantic Ocean**, returning every breeding season to its native breeding areas.
 - **Sixty percent** of the individuals **inhabit the coast of Iceland during**

the breeding season.

- It has **also been found off the coast of Greenland, the United Kingdom, Eastern Canada,** and the Netherlands, as well as Ireland.
- **Features:**
 - It is a **short** and stocky **diving seabird about 12 inches** in length with a **wingspan of 20-24 inches.**
 - It is **black on its upper sides** and **white on its chest and belly.**
 - **Males and females look alike.**
 - It has **bright orange webbed feet; a white face** and cheeks; and a **large, triangular parrot-like bill** that is bright **red and yellow.**
 - They fly through the air like most birds, but **they also "fly" through the water, using their wings as paddles.**
 - They are also **speedy in the air.** They **flap their wings up to 400 times a minute,** speeding along in the air at **55 miles an hour.**
 - **Diet:** Puffins **eat small fish**—such as sand eels and herring—which they hunt underwater.

New species of bagworm moth discovered from Idukki

Eumasia venefica

- The new species has been named due to the peculiar shape of its bag, which resembles a wizard's hat.
- It is the **fourth species of this genus** to be discovered from India.
- **Features:**
 - It has the **clever camouflage** employed to escape predators.
 - **Larval cases** of this species are found **attached to rocks covered with lichens.**
 - The cases attach to each other and form a lichen covered colony.
 - The larval bags look like a 'witch's hat' because of a disc-like anterior and a tubular posterior part.
 - It is not a polyphagous pest as its **larvae only feed** on the algae and **mosses on the rocks.**

Bagworm moth

- They are a family of moths belonging to the **order Lepidoptera** and are known for their protective larval cases.
- These moths are **found worldwide, but primarily in North America and Africa.**
- It is a perennial moth like insect that resides on a number of evergreen as well as junipers in its larva stage.
- They are named for **the baglike cases the larvae construct** around themselves.
- The larvae are often destructive to trees, especially evergreens.

Ancient Remnants of Long-Lost Tectonic Plate Revealed in Borneo

Pontus Tectonic Plate

- It is a **long-lost tectonic plate** recently **discovered in the west Pacific Ocean**.
- It is believed that the massive tectonic plate **was once about 15 million square miles** in size, which equates to approximately **one quarter of the Pacific Ocean**.
- It can be **traced back as far as 160 million years**, and even more **recently to around 20 million years** back.
- It was **slowly subducted** and lost over millions of years, **pulled down under a neighbouring plate by gravity**.
- **How the discovery was made?**
 - The **subducting plate is** actually **denser than the surrounding mantle**, so gravity basically pulls the plate down into the mantle.
 - A **subducted plate leaves behind traces when it 'sinks'** into Earth's mantle – namely, **fragments of rock hidden in mountain belts**.
 - During the process of subduction, however, **the upper parts of the subducting plate are sometimes scraped off**.
 - The researchers **used geological data to reconstruct the movements of the current plates with computer modelling**, which hinted at a wide area potentially vacated by a subducted plate.
 - **Using magnetic techniques**, researchers **determined the basalt from Borneo were relics of Pontus** that were left behind when this part of the plate subducted, some 85 million years ago.

Tectonic Plate

- A tectonic plate (also **called lithospheric plate**) is a **massive, irregularly shaped slab of solid rock**, generally **composed of both continental and oceanic lithosphere**.
- Plate **size can vary greatly**, from a few hundred to thousands of kilometers across; the **Pacific and Antarctic Plates are among the largest**.
- Plate **thickness also varies greatly**, ranging from **less than 15 km** for young oceanic lithosphere **to about 200 km or more for ancient continental lithosphere** (for example, the interior parts of North and South America).
- **Theory of Plate Tectonics:**
 - Plate tectonics is the theory that **Earth's outer shell is divided into large slabs of solid rock, called "plates," that glide over Earth's mantle**, the rocky inner layer above Earth's core.
 - Earth's solid outer layer, which includes the crust and the uppermost mantle, is called the lithosphere. **Below the lithosphere is the asthenosphere — a viscous layer kept malleable by heat deep within the Earth**.
 - It **lubricates the undersides of Earth's tectonic plates, allowing the**

lithosphere to move around.

NASA Shares Stunning Satellite Image Of 'Deception Island'

Deception Island

- Deception Island is **part of** a line of islands called the **South Shetland Islands**, lying **northwest of the Antarctic Peninsula**.
- It is an **active volcano**.
- **Formation:** It was formed by a **massive volcanic eruption**, which caused the **central part of the volcano to collapse** and **allowed seawater to flood the center**, or caldera.
- It has a **unique landscape of barren volcanic slopes, steaming beaches, and ash-layered glaciers** that form a distinctive **horseshoe-shaped opening to the sea through a narrow channel** at Neptune's Bellows.
- The **island surrounds Port Foster**, one of the **safest harbours in the Antarctic**.
- It is **one of the only places in the world where vessels can sail directly into the centre of a restless volcano**.
- It's **one of two active volcanoes around Antarctica**, and it has erupted more than twenty times since the 19th century.
- **Three volcanic eruptions** took place on the island **between 1967 – 1970, destroying the Chilean and the British stations**.
- At present, **Argentina and Spain maintain summer scientific stations** there.
- It is now **managed as part of the Antarctic treaty**, making it a protected area with restricted human visits and impacts.

On its Manesar campus in the Aravalis, NSG takes the battle to 'vilayati kikar'

Prosopis juliflora

- It is a shrub or small tree in the **family Fabaceae, a kind of mesquite**.
- It is native to **Mexico, South America and the Caribbean**.
- It is one of the most invasive species in arid and semi-arid areas.
- It was brought to Delhi by the British in the 1920s, when the national capital was being built.
- In India it is known locally by many names such as **Bellary jaali, seemai karuvelam, seemai jaali, gando baval, vilayati kikar**.
- It has a **very wide ecological adaptability** which can grow on soils from sand dune to clay soil, and from saline to alkaline soil type.
- It can grow below 200 to above 1500 m above sea level, and with a mean annual rainfall ranging from 50 to 1500 mm
- It is considered as an **Invasive plant**.

- It is characterized by vigorous growth which helps them to **outcompete indigenous plant species.**

Impacts

- This tree absorbs more than four litres of water to obtain one kilogram of biomass.
- It **cannot even shelter birds** as it produces less oxygen and more carbon dioxide.
- It can also turn the **groundwater poisonous.**
- It **causes land erosion** due to the loss of the grasslands that are habitats for native plants and animals.

Gray whales experience major population swings as a result of Arctic conditions

Grey whales

- Gray whales have a **hump and a ridge of sharp bumps along their backs**, instead of a dorsal fin.
- They are a **type of baleen whale**, which means they **filter food from the water** through special bristly structures in their mouths.
- They stay close to **shore and feed in shallow water.**
- They are found mainly in **shallow coastal waters in the North Pacific Ocean**, although during migration, they do sometimes cross deep waters far from shore.
- There **are two geographic distributions of gray whales** in the North Pacific:
 - The **eastern North Pacific stock** or DPS, found along the west coast of North America.
 - The **western North Pacific stock** or DPS, primarily found along the coast of eastern Asia.
- **Migration journey**
 - They are well-known for migrations that take them between feeding and breeding areas, swimming as much as 12,000 miles round trip.
 - Western gray whales migrate into their summer feeding grounds near **Sahkalin Island, Russia** in late May or early June and return to their winter feeding grounds in the South China Sea in late autumn.
 - Summer feeding grounds for the eastern population lie in the **Bering and Chukchi Seas between Alaska and Russia.**
 - In the winter, these eastern gray whales migrate south along the west coast of the US to Mexico to breed and have their calves.
- **Conservation status**
 - **IUCN:** Western Grey whale (**Critically endangered**) and Eastern Grey whale (**Least concern**)

Hailstorm in Kulgam, Shopian damages harvest-ready apple

Hailstorm

- **Hail** is a type of **solid rain made up of balls** or lumps **of ice**.
- **Storms that produce hail** that **reaches the ground** are **known as hailstorms**.
- They typically **last for no more than 15 minutes** but can cause **injuries to people and damage** buildings, vehicles, and
- They are most **common in the midlatitudes**.
- Hailstorms can sometimes be **accompanied by** other **severe weather events, such as cyclones** and tornadoes.
- **Size:** The size of hailstones can **vary widely**, from **small pellets less than 1/4 inch** in diameter to **larger stones** measuring **several inches in size**.
- **Conditions for Hailstorms to occur:**
 - **Highly developed Cumulonimbus clouds** need to be present. These are the massive **anvil or mushroom-shaped clouds** that are **seen during thunderstorms**, which can **reach heights of up to 65,000 feet**.
 - There must be **strong currents of air ascending through these clouds**. These currents are commonly **known as updrafts**.
 - **The clouds will need to contain high concentrations of supercooled liquid water**.
- **How are Hails formed?**
 - It begins as a **water droplet** that is **swept up by an updraft inside of a thundercloud**.
 - **Other supercooled water droplets** which are already **present inside the cloud** will **adhere to the water droplet's surface, forming layers of ice** around it.
 - As the **water droplet reaches higher elevations** within the cloud, it **comes into contact with more** and more **supercooled particles**.
 - The **hail embryo will grow larger** and larger as it reaches higher altitudes in the updraft.
 - Finally, **it will reach a size** and weight **where gravity will begin to act** on it and **pull it down**.
 - **Large hailstones** are often characterized by **alternating layers of clear and opaque ice, caused by irregular rates of freezing**.

SCIENCE & TECH

Senescent immune cells promote lung tumor growth

Macrophages

- Macrophages are a **type of white blood cell** that plays an important **role in the human immune system**.
- They are involved in the **detection, phagocytosis, and destruction of bacteria and other harmful organisms**.
- The term macrophage is formed by the combination of the **Greek terms "makro" meaning big, and "phagein" meaning eat**.
- They are **essential for the maintenance and defence of host tissues**, doing so **by sensing and engulfing particulate matter** and, when necessary, **initiating a pro-inflammatory response**.
- They can **modify themselves to form different structures** in order to fight various different microbes and invaders. In this way, macrophages **provide the first line of defense in protecting the host from infection**.
- They are also **involved in the development of non-specific or innate immunity**.
- Macrophages **produce a variety of cytokines**, which are **signaling molecules that communicate with other cells of the immune system**. Cytokines play a role in inflammation, tissue repair, and the adaptive immune response.
- They **migrate to and circulate within almost every tissue, patrolling for pathogens** or eliminating dead cells.
- Macrophages **may have different names according to where they function in the body**. For example, macrophages present in the brain are termed **microglia** and in the liver sinusoids, they are called Kupffer cells.

Cellular Senescence

- It refers to a **state of stable cell cycle arrest** in which **proliferating cells become resistant to growth-promoting stimuli**, typically in response to DNA damage.
- During this phase, **the cell undergoes numerous phenotypic and metabolic changes**.
- **Senescent cells accumulate during ageing** and have been **implicated in promoting a variety of age-related diseases**.
- Cellular senescence **can compromise tissue repair and regeneration**, thereby **contributing towards ageing**.
- **Removal of senescent cells can attenuate age-related tissue dysfunction** and extend the health span.
- Senescence **can also act as a potent anti-tumour mechanism** by **preventing the proliferation of potentially cancerous cells**

WHO recommends second malaria vaccine

- The R21 vaccine is the **second malaria vaccine recommended by the WHO, following the RTS,S/AS01 vaccine**, which received a WHO recommendation in 2021.
- WHO is **now reviewing the vaccine for prequalification**, which is the WHO stamp of approval, and will enable GAVI (a global vaccine alliance) and UNICEF to buy the vaccine from manufacturers.

R21/Matrix-M Vaccine

- It is a **new vaccine approved for the prevention of malaria in children**.
- It was **developed by the University of Oxford and the Serum Institute of India** with support from the European and Developing Countries Clinical Trials Partnership ('EDCTP'), the Wellcome Trust, and the European Investment Bank ('EIB').
- It is the **first malaria vaccine to reach the WHO's target of 75% efficacy**.
- It has already been **approved for use in Burkina Faso, Ghana, and Nigeria**.
- The vaccine **will be rolled out in those African countries in early 2024** and will be **available in mid-2024 in other countries**.

Malaria

- It is a life-threatening disease **caused by parasites** that are **transmitted to people through the bites of infected female Anopheles mosquitoes**.
- There are 5 parasite species that cause malaria in humans, and **2 of these species, Plasmodium falciparum and Plasmodium vivax, pose the greatest threat**.
- Malaria is **common in tropical areas** where it's hot and humid.
- **Children under 5 years of age are the most vulnerable** group affected by malaria.
- **Symptoms:**
 - The signs and symptoms of malaria are **similar to flu symptoms**.
They include:
 - **Fever** and sweating.
 - **Chills** that shake your whole body
 - **Headache** and muscle aches.
 - **Fatigue**.
 - **Chest pain, breathing problems**, and cough.
 - ****Diarrhoea,**nausea and vomiting**.
 - **As malaria gets worse**, it can **cause anemia and jaundice**.
 - The most **severe form of malaria**, which may **progress to a coma**, is **known as cerebral malaria**. This type represents about **15% of deaths in children** and nearly **20% of adult deaths**.
- **Treatment:**
 - It is **preventable and curable**. With **early treatment**, most people with

malaria **will make a full recovery.**

- **Some drugs are given in combination** with other drugs. The type of parasite will determine the type of medication.
- The **main antimalarial drugs are:**
 - chloroquine
 - hydroxychloroquine
 - primaquine
 - artemisinin-based therapy
 - atovaquone-proguanil

Green Ammonia Imported through VOC Port

Green Ammonia

- It is produced by using **hydrogen from water electrolysis** and nitrogen separated from the air.
- These are then fed into the **Haber process (also known as Haber-Bosch)** which is powered by sustainable electricity.
- In the Haber process, hydrogen and nitrogen are reacted together at **high temperatures and pressures to produce ammonia, NH₃.**
- Green ammonia production is where the process of **making ammonia is 100% renewable and carbon-free.**
- It can be **used in**
 - **Fuel for engines** such as locomotives and shipping, replacing diesel and marine fuel oil
 - Fuel source for electricity and power generation
 - Building block **to make fertilisers** for use in agriculture;
 - Feedstock for industrial and manufacturing applications ranging from water purification through to pharmaceuticals

Ammonia

- It is a **colourless**, highly irritating gas with a sharp suffocating odor.
- It **dissolves easily in water** to form ammonium hydroxide solution which can cause irritation and burns.
- Ammonia gas **is easily compressed and forms a clear**, colorless liquid under pressure.
- It is usually shipped as a compressed liquid in steel cylinders.
- Ammonia is not highly flammable, but containers of ammonia may explode when exposed to high heat.

Physicists who built ultrafast 'attosecond' lasers win Nobel Prize

Attosecond

- An attosecond is an astonishingly **short unit of time**, equivalent to **one quintillionth of a second (1×10^{-18} of a second)** or one-billionth of a nanosecond.
- To put this **into perspective, if a second were stretched to cover the entire age of the universe**, which is approximately 13.8 billion years, **an attosecond would be just a fraction of a second.**
- **The fundamental significance** of attoseconds in physics lies in their **ability to shed light on phenomena that were previously hidden from our view.**
- **These extremely short time intervals are relevant in the fields of ultrafast optics and laser physics**, particularly when studying the behavior of electrons within atoms and molecules.
- **Applications:**
 - Attosecond physics allows scientists to **look at the very smallest particles at the very shortest timescales.**
 - At this timescale, researchers can **now capture the dynamics of electrons within atoms and molecules**, allowing them to **witness the incredibly fast processes that govern chemical reactions** and electronic behavior.
 - **Attosecond pulses:**
 - One of the most groundbreaking applications of attosecond science is the ability to **create and manipulate extreme ultraviolet (XUV) and X-ray pulses**, which are vital for **imaging ultrafast processes at the atomic and molecular scale.**
 - These pulses are **produced using high-intensity laser systems that generate attosecond bursts of light.**
 - With these attosecond pulses, **scientists can "freeze" the motion of electrons within atoms and molecules**, providing a **real-time view of electron movement** during chemical reactions.
 - The Attosecond pulses can be **used to test the internal processes of matter and to identify different events.**

Cell biologists identify new organelle present in mammalian cells made of rings of DNA

Exclusome

- It is a **newly discovered organelle in mammalian cells.**
- It is **made up of DNA rings known as plasmids.**
- It is **located within the cell plasma.**
- This is **peculiar because eukaryotic cells** (cells with nuclei) **usually keep most of their DNA in the cell nucleus**, where it is **organized into chromosomes.**

- **Instead, in the exclusome, it is organized into plasmids -small, circular DNA strands that can replicate independently of chromosomes** and are usually found in bacteria and other microscopic organisms.
- **What has the discovery revealed?**
 - **Some of the plasmids that end up in the exclusome originate from outside the cell, while others—known as telomeric rings—come from the capped ends of chromosomes, the telomeres.**
 - Particularly **in certain cancer cells, the ones from the telomeres are regularly pinched off and joined together to form rings.**
 - **The cell nucleus weeds out such DNA rings** and deposits them, together with the plasmids coming from outside the cell, in the cell plasma.
 - **This proves that cells are capable of differentiating between DNA that is their own and still needed and DNA that is foreign** or presumably no longer required, **which they then eject from the nucleus.**
 - In this way, the **exclusome may have a protective function, guarding the cell's genetic integrity.**

Organelle

- Organelles are **small, specialized structures in cells** that operate like organs by **carrying out specific tasks.**
- Among the more **important cell organelles are the nuclei**, which store genetic information; **mitochondria**, which produce chemical energy; and **ribosomes**, which assemble proteins.

Chromosome

- A chromosome is a **long, thread-like structure found in the nucleus of eukaryotic cells**, including the cells of animals, plants, and fungi.
- Each chromosome is **made up of DNA tightly coiled many times around proteins called histones** that support its structure.
- Chromosomes help **ensure that DNA is replicated and distributed appropriately during cell division.**
- It plays a **fundamental role in the transmission of hereditary traits** from one generation to the next.

Iron Atoms Discovered on the Move in Earth's Solid Inner Core

Earth's Inner Core

- It is the **innermost layer of the Earth.**
- **Structure:**
 - It is a **solid metallic ball** primarily **composed of iron and nickel.**
 - The inner core **is solid due to the pressure caused by the weight put**

- **on it** by the Earth's other top layers.
- It is **distinct from the outer core, which is a liquid.**
- **Depth:**
 - The inner core is located at the Earth's center, **approximately 5,150 kilometers (3,219 miles) beneath the Earth's surface.**
 - The **boundary between the inner and outer cores is called the Lehman Seismic Discontinuity.**
- **Radius:** The inner core has an **average radius of 1220 km.**
- **Temperature:**
 - Inner core temperatures reach **extraordinary levels, estimated to be between 7,200–8,500°F (4,000–4,700°C).**
 - The **primary contributors** to the inner core's heat are the **decay of radioactive elements** such as uranium, thorium, and potassium in Earth's crust and mantle, **residual heat from planetary formation, and heat emitted by the solidification of the outer core.**
- **Other Features:**
 - It is predicted to have very **high thermal and electrical conductivity.**
 - The inner core **generates its own magnetic field.**
 - Despite its **small volume (less than 1% of the Earth's volume)**, the Earth's inner core **contains about 10% of the total magnetic field energy.**
 - It plays a **crucial role in outer core liquid motions and the geodynamo, which generates the Earth's magnetic field.**
 - It **rotates in the same direction** as the surface of the planet **but a bit faster than the rest of the planet.**

Different layers of the Earth

- The earth is made up of **three different layers: the crust, the mantle, and the core.**
- **The crust:** This is the **outside layer** of the earth and is **made of solid rock, mostly basalt and granite.**
- **The mantle:**
 - It lies **below the crust and is up to 2900 km thick.**
 - It consists of **hot, dense, iron and magnesium-rich solid rock.**
- **The core:**
 - It is the **center of the earth** and is **made up of two parts: the liquid outer core and solid inner core.**
 - The **outer core is made of nickel, iron, and molten rock.**

Personality Disorders Linked to Increased Risk of Fatty Liver Disease

Non-Alcoholic Fatty Liver Disease (NAFLD)

- NAFLD is the **term for a range of conditions caused by a buildup of fat in the liver.**

- This buildup of fat is **not caused by heavy alcohol use**. When heavy alcohol use causes fat to build up in the liver, **this condition is called alcohol-associated liver disease**.
- **Two types of NAFLD are nonalcoholic fatty liver (NAFL) and nonalcoholic steatohepatitis (NASH)**.
- People **typically develop one type** of NAFLD or the other, although **sometimes people with one form are later diagnosed with the other form** of NAFLD.
- **NAFL:**
 - NAFL is a form of NAFLD in which you **have fat in your liver but little or no inflammation or liver damage**.
 - NAFL typically **does not progress to cause liver damage** or complications.
 - However, NAFL **can cause pain from enlargement of the liver**.
- **NASH:**
 - NASH is the form of NAFLD in which you **have inflammation of the liver and liver damage, in addition to fat in your liver**.
 - The inflammation and liver damage of NASH **can cause fibrosis, or scarring, of the liver**.
 - **NASH may lead to cirrhosis**, in which the liver is scarred and permanently damaged. Cirrhosis can **lead to liver cancer**.
- **Who is more likely to develop NAFLD?**
 - NAFLD is more **common in people who have certain diseases and conditions, including obesity**, and conditions that may be **related to obesity**, such as type 2 diabetes.
 - NAFLD can **affect people of any age, including children**.
- **Treatment:**
 - There's currently **no specific medication for NAFLD**.
 - Doctors **recommend weight loss to treat NAFLD**.
 - Weight loss **can reduce fat, inflammation, and fibrosis in the liver**.
 - **Treatment may also be recommended for associated conditions** (high blood pressure, diabetes, and cholesterol) or complications.

2023 Chemistry Nobel Prize: What are quantum dots and what is the work that won the prize?

Quantum Dots (QDs)

- Quantum dots, often **referred to as "artificial atoms," are semiconductor nanoparticles** that have **unique optical and electronic properties due to their small size**.
- They were first theorized in the 1970s and then **successfully synthesized in the early 1980s**.
- **Many semiconductor substances can be used as QDs**, such as cadmium selenide, cadmium sulfide, or indium arsenide. **Nanoparticles of these, or**

- any other semiconductor substance, **have the properties of a QD.**
- **The size and composition of the QDs can be controlled** during synthesis, allowing scientists **to tailor their properties for various applications.**
 - **Optical Properties:** One of the most notable features of QDs is their tunable emission properties.
 - **By controlling the size of the QD**, researchers can precisely **tune the wavelength of light emitted or absorbed.**
 - They can be **engineered to emit light across the entire visible spectrum** and into the infrared and ultraviolet ranges, **offering a wide palette of colors** for various applications.
 - **The smallest quantum dots emit higher energy waves and produce blue light**, and the **biggest dots release lower energy waves, creating red light**, with the middle sizes creating the colours in between.
 - **Applications:**
 - **Displays:** They are used in display technology **to enhance the color and efficiency of displays** for TVs, monitors, and other electronic devices.
 - Compared to organic luminescent materials used in organic light emitting diodes (OLEDs), **QD-based materials have purer colors, a longer lifetime, lower manufacturing costs, and lower power consumption.**
 - **Photovoltaics:** QDs can be **used in solar cells to enhance light absorption and energy conversion efficiency.**
 - **Bio-medical applications:** The **small size of QDs allows them to go anywhere in the body**, making them suitable for different **bio-medical applications like medical imaging, biosensors, targeted drug delivery, etc.**
 - **Quantum Computing:** QDs are being investigated for their potential role in quantum computing, as **they can serve as qubits, the fundamental units of quantum information.**

Even platypuses aren't safe from bushfires — a new DNA study tracks their disappearance

Platypus

- It is a duck-billed, beaver-tailed, otter-footed, **egg-laying mammal.**
- It is a small species of semi-aquatic mammal **indigenous to the eastern coast of Australia.**
 - They are solitary animal that despite occupying overlapping home ranges, only comes together during the breeding season.
- They are **nocturnal hunters.**
- **Habitat:** They are found in freshwater systems from tropical rainforest lowlands and plateaus of far **northern Queensland to cold**, high altitudes of

Tasmania and the Australian Alps.

- **Appearance**
 - The platypus is an **animal with a small, streamlined body** that is covered in short and dense waterproof fur.
 - The watertight nostrils on its bill remain sealed so that the animal can stay submerged for up to two minutes as it forages for food.
 - The bill also comes equipped with **specialized nerve endings**, called **electroreceptors**, which detect tiny electrical currents generated by the muscular contractions of prey.
 - Male platypuses have a spur on the inner side of each ankle that is connected to a **venom gland** located over the thighs.
- **Diet:** They are **carnivorous mammal** whose diet is almost solely comprised of bottom-dwelling aquatic creatures.
- **Conservation status**
 - **IUCN:** Near Threatened

Scientists develop enzyme mimetic with potential applications in wastewater treatment, healthcare

NanoPtA

- The research team synthesised a **platinum-containing nanozyme called NanoPtA**, which can be converted into powder form for industrial use.
- **How it works?**
 - When the NanoPtA comes in contact with wastewater, the benzene rings and long alkyl chains present in the molecule **form multiple non-covalent interactions**.
 - Individual NanoPtA molecules connect together to form tape-like structures that start emitting light, which is the origin of its oxidising capacity.
 - The nanozyme can then **degrade pollutants** present in wastewater by **oxidising them in the presence of sunlight**, thereby reducing the toxicity of wastewater.
- The team found that the nanozyme could degrade even small (micromolar) quantities of common effluents like phenols and dyes within ten minutes when placed under sunlight.
- The researchers also found that the NanoPtA complex was quite stable, lasting for up to 75 days at room temperature.
- **Applications:** The nanozyme can also have **applications in healthcare** and could be a potentially useful diagnostic tool for **neurological and neurodegenerative diseases**.

Enzymes

- These are **proteins** that **catalyse** a majority of **biological reactions in living systems**.

- The practical use of natural enzymes is hindered by inherent limitations such as **sensitivity to denaturation** (breakdown/damage), **complex production procedures**, high costs, and difficulties in recycling.
- Mass producing these enzymes is an expensive and time-consuming process.
- Another problem is storage – most of the natural enzymes **are temperature-sensitive and require storage at cooler temperatures**, often as low as -20°C .
- Nano-sized enzyme mimetics or “nanozymes” manufactured in the lab can mimic such natural enzymes and overcome these practical challenges.

WSU Researchers Uncover Key Fischer-Tropsch Process Insight to Boost Fuel Production

Fischer – Tropsch (FT) process

- FT process is the process where **synthesis gas (H_2 and CO) is converted into** a mixture of **hydrocarbons, oxygenates, water, and carbon dioxide**.
- It was first **developed in the 1920s** and was named after its **discoverers, Franz Fischer and Hans Tropsch**.
- It involves the **reaction of carbon monoxide (CO) and hydrogen (H_2) gases**. These gases are typically **derived from various sources**, including coal, natural gas, or biomass, **through the process of gasification**.
- **FT process:**
 - Synthesis gas (**syngas**) is the **feed material** for a FT process.
 - The FT reaction is usually a **catalytic reaction at high temperatures and high pressure** and the typical **catalysts used are based on iron or cobalt**.
 - FT process is the **catalytic polymerization and hydrogenation of CO** , which **produces a synthetic crude oil (syncrude)**.
 - Syncrude is a **multiphase mixture of hydrocarbons, oxygenates, and water**.
 - The **next step is the refining of the syncrude into products** that are traditionally produced from conventional crude oil, **such as transportation fuels and petrochemicals**.
- **Applications:**
 - It has several important applications, including the **production of synthetic fuels and chemicals**.
 - The hydrocarbons produced by the FT process **can be refined and used in place of more conventional liquid fuels** derived from crude oil.
 - Generally, **these products are of higher quality** than those derived through conventional means, **having no sulphur or aromatics**.

PUSA-44 Paddy Variety Ban in Punjab

PUSA-44

- It is a **paddy variety** which was developed in 1993 by the **Indian Council of Agricultural Research (ICAR)**.
- By the end of 2010s, it had gained widespread popularity among farmers across the Punjab, covering approximately **70 to 80% of the area under paddy cultivation**.
- Farmers claim that PUSA-44 yields nearly 85 to 100 mann (34 to 40 quintals) per acre, while other varieties' yield average is 28 to 30 quintals per acre.
- **Concerns**
 - It is a **long-duration variety**, taking around 160 days to mature.
 - This is around 35 to 40 days more than other varieties, requiring 5-6 extra cycles of irrigation.
 - With Punjab facing **severe groundwater depletion** and the availability of short-duration paddy varieties, the government aims to conserve one month of irrigation water by banning the variety.
 - Moreover, this variety is also known to **exacerbate** the long-running issue of **stubble burning in the state**.
 - This variety generates around **2 per cent more stubble** than short varieties, which becomes a significant concern when cultivated on a large scale.

ICAR

- It is an **autonomous organisation** under the Department of Agricultural Research and Education (DARE), **Ministry of Agriculture and Farmers Welfare**, Government of India.
- It was formerly known as Imperial Council of Agricultural Research.
- It was established on 16 July 1929 as a registered society under the **Societies Registration Act, 1860** in pursuance of the report of the Royal Commission on Agriculture.
- The Council is the apex body for **co-ordinating, guiding and managing research** and education in **agriculture** including horticulture, fisheries and animal sciences in the entire country.
- With 113 ICAR institutes and 71 agricultural universities spread across the country this is one of the largest national agricultural systems in the world.
- **Headquarters:** New Delhi.

FSSAI clarifies addition of protein binders not permitted in milk, products

- This clarification came at a time when certain players are adding protein binders to offer **thicker texture in dairy products** such as curd.

Protein binders

- These are biological agents have emerged as an important and required class of ingredients to manufacture a wide range of **new food products, especially semi-solid or solid foods.**
- These are known to **affect the digestibility of the protein** bound and thus can affect the biological and nutritive value of milk proteins.
- Protein binding also influences the bioavailability and distribution of active compounds.

Milk protein

- It is a good source of **essential amino acids.**
- They are **easily digestible** and do not contain any **anti-nutritional factors** like many plant-based proteins.

FSSAI

- It is a **statutory body** established under the **Food Safety and Standards Act, 2006** (FSS Act).
- FSS Act, of 2006 consolidated various acts & orders that had earlier handled food-related issues in various Ministries and Departments.
- **Nodal ministry:** Ministry of Health & Family Welfare.

Earth's smallest flowering plant may become food, oxygen source for astronauts

Watermeal

- Watermeal is an **aquatic plant in the Araceae family.**
- It is the **smallest flowering plant in the world** and **appears as small green seeds.**
- It is often **referred to as "duckweed"** because it is a **favorite food of ducks.**
- **Distribution:**
 - It flourishes in **temperate, sub-tropical, and tropical locations.**
 - They grow on the **surface of lakes, ponds, and marshes.**
- **Features:**
 - It is a **very tiny (less than 1 millimeter)** light **green, free-floating, rootless plant.**
 - It is **branchless** and also has **no leaves.**
 - It consists of a **single, oval, or spherical frond** that floats on the surface of still or slow-moving water bodies.
 - It also **produces the world's smallest fruit, called a utricle.**
 - It is a **nutritional powerhouse.** It is a complete protein, meaning that it **contains all nine essential amino acids.**
 - In some cases, **watermeal can become invasive** and form dense mats

that cover the entire surface of a water body.

Phonotaxis: First sound, then motion

Phonotaxis

- Scientists call phonotaxis as the **movement by an animal in response to a sound**.
- It has mostly been observed among **crickets, moths, frogs**, and toads, among a few other creatures.
- There are **two types of phonotaxis**
 - **Positive phonotaxis:** The purpose of positive phonotaxis is attraction. It usually happens when the females of a particular species – including those of crickets and frogs – are attracted to the sounds made by the males.
 - **Negative phonotaxis:** It **serves to repel or warn**, such as when the sound of a predator nearby signals to an animal that it needs to move away. Crickets in particular have been found to steer themselves away from low-intensity ultrasound typically associated with bats (which use it for echolocation).
- In 1984, scientists found that **Mediterranean house geckos** (*Hemidactylus turcicus*) use positive phonotaxis to their advantage.
- The fields that these geckos inhabited were also home to male decorated crickets (*Gryllodes supplicans*), which used species-specific sounds to attract the females from their burrows.
- The geckos recognised and followed this call until they reached the burrow, where they consumed the female crickets.

What is Hemochromatosis, the rare genetic disorder that causes organ dysfunction?

Hemochromatosis

- It is an **inherited condition** where **iron levels** in the body slowly **build up over many years**.
- This health condition is primarily **classified into two types**:
 - **Hereditary hemochromatosis:** It is driven by a **mutation in the HFE gene**, resulting in individuals being homozygous for the C282Y variant.
 - This genetic anomaly sets the stage for a lifelong struggle with **excessive iron absorption within the intestines**.
 - **Secondary hemochromatosis:** It is typically caused by external factors like **frequent blood transfusions, excessive iron supplementation**, or certain medical conditions.
 - The iron accumulation in secondary hemochromatosis is **often more**

rapid and can have a similar impact on organ function

- Symptoms of haemochromatosis usually **start between the ages of 30 and 60**.
- **Common symptoms include:** Feeling very tired all the time (fatigue), weight loss, weakness and joint pain etc
- **Treatment:**
 - **Phlebotomy** is the standard treatment for primary hemochromatosis.
 - Iron toxicity can be reduced by **removing red blood cells**, the body's main mobilizer of iron.
 - Phlebotomy is usually performed once or twice a week.

'Half of her brain switched off': California doctors perform 'special' surgery to save ailing girl's life

Rasmussen's encephalitis

- It is a very rare, **chronic inflammatory neurological disease** that usually affects only one hemisphere (half) of the brain.
- It most often occurs in **children under the age of 10** but can also affect adolescents and adults.
- **Symptoms**
 - Frequent and severe seizures
 - Inflammation of the brain (encephalitis)
 - Mental deterioration
 - Progressive loss of neurological functions including motor skills, speech, and eventual paralysis on one side of the body (hemiparesis)
- Treatment may include:
 - **Antiseizure medications:** Antiseizure medications usually don't completely manage seizures due to RE. But they may help decrease the frequency and severity of the seizures.
 - **Immunotherapy:** Immunotherapy at the beginning of RE may help manage seizures or prevent further immune-related brain damage.
 - **Brain surgery:** Hemispherectomy is most effective in treating seizures in RE. It involves surgically removing or disconnecting half of your child's brain from the rest of their brain.

FDA finds no misconduct at trial sites for Pfizer's Lyme disease shot

Lyme Disease

- It is a **vector-borne infectious disease** caused by the **bacterium Borrelia burgdorferi**.
- **Transmission:**
 - It is primarily **transmitted to humans through the bite of** infected

- **black-legged ticks**, often referred to as **deer ticks**.
- Lyme disease **cannot spread**:
 - **between humans**
 - **from pets to humans**
 - **through air, food, or water**
- **Lice, mosquitoes, fleas, and flies also do not transmit it.**
- It is most **commonly reported in North America, Europe, and some parts of Asia.**
- **Symptoms:**
 - **Early symptoms** of Lyme disease **start between 3 to 30 days** after an infected tick bites you. The symptoms **can include**:
 - **A red rash called erythema migrans (EM). Most people with Lyme disease get this rash. It gets bigger over several days and may feel warm. It is usually not painful or itchy. As it starts to get better, parts of it may fade. Sometimes this makes the rash look like a "bull's-eye."**
 - **Fever**
 - **Chills**
 - **Headache**
 - **Fatigue**
 - **Muscle and joint aches**
 - Swollen lymph nodes
 - **If left untreated**, it can lead to more **severe symptoms, affecting the joints, heart, and nervous system.**
- **Treatment:**
 - The **standard treatment** for Lyme disease **is antibiotics**, such as doxycycline or amoxicillin, especially in the early stages.
 - **In later stages, intravenous antibiotics** may be required.

CSIR-CCMB study to understand genetics behind diseases

Diverse Epigenetic Epidemiology Partnership (DEEP)

- It is a ground-breaking integrated **genomics and epigenomics** study to understand the **genetics behind Non-Communicable Diseases (NCDs)** in diverse populations, including South Asians.
- The project is to uncover the effects of genomic and environmental diversity in disease risk observed in people across the world, including those **in Asia, Africa and North and South America.**
- It is a **five-year international project.**
- Researchers will be studying individuals representing diverse genetic and environmental contexts and learn **which DNA methylation patterns contribute to their disease** risk in each context
- The study will **develop software and infrastructure** and conduct advanced statistical analyses to build new resources.

- These new resources will sit alongside international health and genetics databases to look at trends in variation in **DNA methylation**.
- **Significance of this initiative**
 - This research will enable **identification of disease-causing mechanisms** that are common worldwide and those which are unique to particular groups or regions.
 - It will help with answering questions such as whether **medicines** developed in one part of the **world will be effective for all**.
 - Ultimately the DEEP study hopes to enable targeted interventions or treatments and reduce global health disparity and inequity.

DNA methylation

- It is a process where chemical groups attach to DNA in order to help **to turn genes on and off**.
- It is a type of **epigenetic modification**, helps the body to respond to environmental signals and ultimately contributes to whole system health and disease status.
- Understanding relationships between DNAm, genetics and environment is essential for understanding **pathways of health, disease and consequences**.

CDSCO approves ImmunoACT's CAR-T cell therapy

CAR-T cell therapy

- The therapy represents a quantum leap in the sophistication of **cancer treatment**.
- Unlike chemotherapy or immunotherapy, which requires mass-produced injectable or oral medication, **CAR T-cell therapies use a patient's own cells**.
- They are modified in the **laboratory to activate T-cells**, a component of immune cells, to attack tumours.
- These modified cells are then infused back into the patient's bloodstream after conditioning them to multiply more effectively.
- As of today, CAR T-cell therapy has been approved **for leukaemias** (cancers arising from the cells that produce white blood cells) **and lymphomas** (arising from the lymphatic system).

How does it work?

- In this therapy, the **patient's blood is drawn to harvest T-cells – immune cells** that play a major role in destroying tumour cells.
- Researchers modify these cells in the laboratory so that **they express specific proteins on their surface**, known as chimeric antigen receptors (CAR): they have an affinity for proteins on the surface of tumour cells.
- This modification in the cellular structure allows CAR T-cells to **effectively**

bind to the tumour and destroy it.

- The final step in the tumour's destruction involves its clearance by the patient's immune system.
- In CAR T-cell therapy, the immune system is activated when the modified T-cells are reintroduced into the body, which allows a gradual and sustained tumour kill as these cells multiply.

NexCAR19

- It is an indigenously developed **CD19-targeted CAR-T cell therapy**.
- **CD-19 is biomarker** for B lymphocytes and can be utilised as a target for leukemia immunotherapies.
- It is the result of a **collaborative effort** across a decade between **IIT Bombay and Tata Memorial Centre (TMC)**.

Study reveals unexpected variation in genetic code of protist

Protists

- Protists are a diverse collection of **organisms that do not fit into animal, plant, bacteria, or fungi groups**.
- Kingdom Protista is **one of the six kingdoms of life** (the others being Eubacteria, Archae, Fungi, Plantae, and Animalia).
- Protists are believed to be the common **ancestral link between plants, animals, and fungi** from which these three groups branched out in the process of evolution.
- Protists **are eukaryotes** as they **possess a nucleus and other membrane-bound organelles** (structures that perform a specific job).
- The **majority** of them **are unicellular**, like an amoeba; however, a **few protists are multicellular, like seaweed**.
- However, **multicellular protists do not have highly specialized tissues** or organs.
- **Most protists have mitochondria**, the organelle that generates energy for cells to use. The **exceptions are some protists that live in anoxic conditions** or environments lacking in oxygen.
- **Habitat:** Nearly all protists **exist in some type of aquatic environment**, including freshwater and marine environments, damp soil, and even snow.
- **Many protists**, such as algae, **are photosynthetic** and are vital primary producers in ecosystems.
- **Some protists are responsible for a range of serious human diseases**, such as **malaria** and **sleeping sickness**.

Egypt attains WHO 'Gold Tier' status in Hepatitis C Elimination

Hepatitis C

- It is a **viral infection that affects the liver.**
- It can cause both acute (short term) and chronic (long term) illness. It can be life-threatening.
- **Transmission:**
 - It is spread through **contact with infected blood.**
 - This can happen through sharing needles or syringes, or from unsafe medical procedures such as blood transfusions with unscreened blood products.
 - It can be passed **from an infected mother to her baby** and via sexual practices that lead to exposure to blood.
 - Hepatitis C is **not spread through breast milk**, food, water or casual contact such as hugging, kissing and sharing food or drinks with an infected person.
- **Symptoms:** It can include fever, fatigue, loss of appetite, nausea, vomiting, abdominal pain, dark urine and yellowing of the skin or eyes (jaundice).
- **Geographical distribution**
 - This virus infection **occurs in all WHO regions.**
 - The highest burden of disease is in **the Eastern Mediterranean Region** and **European Region.**
- New HCV infections are usually asymptomatic, few people are diagnosed when the infection is recent.
- In those people who develop chronic HCV infection, **the infection is often undiagnosed** because **it remains asymptomatic until decades** after infection when symptoms develop secondary to serious liver damage.
- **There is no vaccine for hepatitis C**, but it can be **treated with antiviral medications.**

Gold tier status

- It includes meeting **specific criteria** such as
 - Ensuring **100% blood and injection safety**, maintaining a minimum of 150 needles/syringes per year for people who inject drugs (PWID)
 - **Diagnosis** of over **80% of people living with chronic hepatitis C virus (HCV)**,
 - Treating of over 70% of individuals diagnosed with HCV.
 - The establishing of a **sentinel surveillance Programme** for hepatitis sequelae, including liver can

India's first tilapia parvovirus reported in Tamil Nadu

Tilapia parvovirus (TiPV)

- It is a small, nonenveloped, **single-stranded DNA (ssDNA) virus.**
- It **was first reported in China** in 2019 and Thailand in 2021. India is the

third country to report the occurrence of TiPV.

- This virus was localized in the gills, heart, brain, liver, pancreas, spleen, intestine, kidney, eyes, and muscles of tilapia.

Tilapia fish

- Tilapia is a common name used for certain species of fishes belonging to **the family Cich lidae (order Perciformes)**.
- These are freshwater **species native to Africa**.
- It is easily raised and harvested food fish.
- Their commercial advantages include resistance to disease, and a diet of readily abundant algae and zooplankton.
- Tilapia' has emerged to be one of the most productive and internationally traded food fish in the world.
- The culture of tilapia has become commercially popular in many parts of the world and the fishery experts have dubbed **the tilapia as "aquatic chicken"** due to its quick growth and low maintenance cultivation.
- **Mozambique tilapia** was introduced to Indian fresh water bodies in the 1950s and it is called **Jilabi in Tamil**.
- Capable of **surviving in low-oxygen levels in water**, the fish has turned invasive across the country.
- **Nile tilapia** introduced in the 1970s is a **little bigger and is cultured on a large-scale**
- In India, **tilapia farming** is being carried out in different parts of **Andhra Pradesh and Kerala**.
- Although tilapia are robust and adapted to intensive farming conditions and environmental changes, disease outbreaks, particularly those with viral origins, continue to threaten tilapia production

Cabinet approves royalty rates for lithium, two other strategic minerals

Niobium

- It is a **rare, soft, malleable, ductile, gray-white metal**.
- **Atomic symbol: Nb**
- It has a **body-centered cubic crystalline structure**.
- It **must be placed in a protective atmosphere** when processed at even moderate temperatures because it **tends to react with oxygen, carbon, the halogens, nitrogen, and sulphur**.
- **Melting point: 2,477 degrees Celsius**
- **Boiling point: 4,744 degrees Celsius**
- **In air, an oxide layer forms** over it, whose **colour depends on its thickness**. Shades of **blue, green, and yellow** are typical.
- Niobium **resists corrosion** due to the oxide film.
- The metal **starts to oxidise** rapidly in the air at **200 degrees Celsius**.
- The metal is **inert to acids**, even to aqua regia at room temperature, **but is**

attacked by hot, concentrated acids, and especially by alkalis and oxidizing agents.

- It is **one of the five major refractory metals** (metals with very high resistance to heat and wear).
- It has the property of becoming **superconducting at low temperatures**.
- **Sources:**
 - It is **not found free in nature** but **in minerals such as columbite and tantalite**.
 - Commercially, niobium is **extracted by first forming the oxide** (Nb_2O_5). The **oxide is then reduced using carbon or hydrogen**.
- **Major Producers: Brazil** is the world's largest supplier, with **Canada a distant second**.
- **Applications:**
 - It is used for the **production of high-temperature-resistant alloys and special stainless steels**.
 - It is also used in its pure form to **make superconducting accelerating structures for particle accelerators**.
 - Niobium alloys are **used in surgical implants** because they do not react with human tissue.
 - **Niobium carbide is used in cutting tools**.
 - **Niobium-tin and niobium-titanium alloys** are **used as wires for superconducting magnets** capable of **producing exceedingly strong magnetic fields**.

Qualcomm, Google partner to make RISC-V chip for wearable devices

RISC-V technology

- It is an **open-source technology** that is pronounced "risk five".
- It is an **open-source instruction set architecture (ISA)** used for the development of custom processors targeting a variety of end applications.
- It is considered the **fifth generation of processors** built on the concept of the reduced instruction set computer (RISC).
- It was begun as a **project at UC Berkeley** to create an open-source computer system based on RISC principles.
- It was initially designed for academic use. The standard has evolved and is now managed by RISC-V International.
- **How does RISC-V work?**
 - As an open-standard architecture, RISC-V is defined by member companies of RISC-V International, the **global nonprofit organization behind the ISA**.
 - The intent is that through collaboration, the **member companies can contribute to new avenues of processor innovation** while promoting new degrees of design freedom.
 - It features a small core set of instructions upon which all **the design's**

- **software runs.**
- The architecture allows **designers to customize and build their processor** in a way that's tailored to their target end applications.
- **Benefits of RISC-V include:**
 - Its **open-standard nature**, which **allows collaboration** and innovation across the industry.
 - The entire RISC-V **architecture can be scrutinized closely** in the public domain, eliminating back doors and hidden channels.
- **Applications: Wearables, Industrial, IoT, and Home Appliances,** Smartphones, Automotive, High-Performance Computing (HPC), and Data Centers.

Lao PDR becomes second country in 2023 after Bangladesh to eliminate lymphatic filariasis

Lymphatic Filariasis

- It is commonly known as **elephantiasis**, and it is a **neglected tropical disease**.
- Infection occurs when filarial parasites are **transmitted to humans through mosquitoes**. This impairs the lymphatic system and can lead to the abnormal enlargement of body parts, causing pain, severe disability, and social stigma.
- Cause: It's caused by infection with parasites classified as nematodes (roundworms) of the family Filariodidea. There are three types of these **thread-like filarial worms**:
 - **Wuchereria bancrofti**, which is responsible for **90% of the cases**.
 - **Brugia malayi**, which causes most of the remainder of the cases.
 - **Brugia timori**, which also causes the disease.
- **Symptoms:** About two in every three people who have lymphatic filariasis don't have severe symptoms, but filariasis usually leads to a weakened immune system. Some people may experience **inflammation, Lymphedema, Hydrocele and Edema**.
- **Treatment:**
 - The World Health Organisation recommended preventive chemotherapy strategy for lymphatic filariasis elimination is **mass drug administration (MDA)**.
 - MDA involves administering an annual dose of medicine to the entire at-risk population.
- **Global Initiatives to Eradicate Lymphatic Filariasis:**
 - ****WHO's road map 2021-2030:**** Sets global targets and milestones to prevent, control, eliminate or eradicate 20 diseases.
 - **Global Programme to Eliminate Lymphatic Filariasis (GPELF):** WHO established this to stop the transmission of infection by mass drug administration (MDA) of anthelmintics and to alleviate the suffering of people affected by the disease through morbidity management and

- disability prevention (MMDP).
- According to the WHO progress report on the disease, **Nineteen countries** have been able to **eliminate it**.
 - Of the 19 countries, 11 belong to the WHO Western Pacific Region (WPR). Lao PDR is 11th country in the WPR region to successfully eliminate LF.
 - **South-East Asia region:** Bangladesh, the Maldives, Sri Lanka and Thailand.
 - **Africa region:** Malawi and Togo

Triplex ELISA for Assessing Durability of Taenia solium Seropositivity after Neurocysticercosis Cure

Neurocysticercosis

- It is a **parasitic infection** of the central nervous system and is **caused by the pork tapeworm, Taenia solium**.
- Humans become infected after consuming **undercooked food**, particularly pork, or water contaminated with tapeworm eggs, or through poor hygiene practices.
- Taeniasis is the intestinal infection of the adult tapeworm.
- When left untreated, a more serious condition known as cysticercosis develops as *T. solium* larvae invade body tissues.
- When larvae build up in the central nervous system, muscles, skin, and eyes, it leads to neurocysticercosis.
- It is the most severe form of the disease and a common cause of seizures worldwide.
- **Symptoms**
 - Most often, neurocysticercosis in other areas or organs of the body may remain asymptomatic.
 - But when the condition affects the brain, it causes severe symptoms like **seizures or epilepsy**.
- **Treatment:** It is mainly treated symptomatically and by management of seizures by anticonvulsants.

DEFENCE & SPACE

SAMPRITI-XI: Indian Army and Bangladesh Army commence joint military exercise

Exercise SAMPRITI

- It is an annual **joint military exercise** between India and Bangladesh.
- It was started in Jorhat, Assam in 2009, the exercise has witnessed ten successful editions till 2022.
- This exercise, **alternatingly organised by both countries**, signifies strong bilateral defence cooperation initiatives.
- SAMPRITI-XI, scheduled for 14 days, will engage approximately 350 personnel from both sides.
- The exercise underscores the importance of **enhancing interoperability** between the two armies, **sharing tactical drills, and promoting best practices**.
- The exercise will also witness **participation by personnel from diverse units** such as artillery, engineers and other supporting arms and services from both sides.
- Centered on the conduct of Sub-Conventional Operations as per Chapter VII of the UN mandate, SAMPRITI-XI will include **a Command Post Exercise (CPX) and a Field Training Exercise (FTX), culminating in a Validation Exercise**.
- This exercise promises to further enhance defence cooperation between India and Bangladesh, fostering deeper bilateral relations, cultural understanding, and mutual benefits from shared experiences in Sub Conventional Operations.

DRDO's VSHORAD Missile System To Be A Game-changer For Short-range Threats

Very Short-Range Air Defence (VSHORAD) missile system

- It is a **Man Portable Air Defence System (MANPAD)** specially designed to **counter low-altitude aerial threats over short distances**.
- These are **short-range, lightweight, and portablesurface-to-air missiles** that can be **fired by individuals or small groups**.
- It has been **designed and developed indigenously by DRDO's Research Centre Imarat (RCI), Hyderabad, in collaboration with other DRDO laboratories and Indian industry partners**.
- The use of VSHORAD missiles in India is **primarily by the Indian Army**.
- **Features:**
 - It is designed to provide short-range air defence capabilities to **protect ground forces and critical assets from aerial threats**, including

- helicopters and low-flying aircraft.
- The missile incorporates many **novel technologies, including a Dual-band IIR Seeker, a miniaturised Reaction Control System, and integrated avionics.**
- It is **propelled by a dual-thrust solid motor.**
- The missile and its launcher were **designed by the DRDO to be portable, which enables their quick deployment over difficult terrain.**

This Pune firm to provide unmanned, weaponised boats, undersea drones to counter Chinese threats

- Sagar Defence Engineering Private Limited has **emerged as the winner of the iDEX (Innovations for Defence Excellence) DISC-7 program, particularly under the SPRINT framework.**
- The agreement between the Indian Navy and the organisation **marks the 50th contract awarded under the SPRINT program.**

Autonomous Weaponised Boat Swarms

- These swarms are **strategically designed for naval tactics, employing a coordinated deployment of numerous small unmanned boats** to overwhelm an adversary's naval defenses.
- They are **equipped with a variety of weapons and sensors** that are capable of **remote or autonomous operation.**
- They are equipped with an **integrated system capable of executing a variety of naval and security missions, such as littoral/ODA Patrol, High-Speed Interdiction, Coastal Surveillance, Local Naval Defence, Constabulary Operations, C4ISR, Medium-Sized Unmanned Surface Vessel, and Low-Intensity Maritime Operations (LIMO).**

SPRINT Initiative

- It is an initiative to promote the **development of niche defence technologies by domestic companies.**
- The **Naval Innovation and Indigenisation Organisation (NIIO), in conjunction with the Defence Innovation Organisation (DIO), aims to induct at least 75 new indigenous technologies/products into the Indian Navy** as a part of the Azadi ka Amrit Mahotsav celebration.
- This collaborative **project is named SPRINT - Supporting Pole-Vaulting in R&D through iDEX (Innovations for Defence Excellence), NIIO and TDAC (Technology Development Acceleration Cell).**
- It was **launched by the Prime Minister in July, 2022.**

iDEX (Innovations for Defence Excellence)

- It is the **flagship initiative of the Ministry of Defence (MoD)**, launched in **April 2018**.
- **Aim:** To achieve **self-reliance and foster innovation and technology development** in Defence and Aerospace **by engaging Industries including MSMEs, start-ups**, individual innovators, R&D institutes, and academia.
- iDEX has **partnered with leading incubators in the country to provide handholding, technical support, and guidance to the winners of iDEX challenges**.
- iDEX will **be funded and managed by a 'Defence Innovation Organization (DIO)'** which has been **formed as a 'not for profit company'** as per Section 8 of the Companies Act 2013 **by the two founder members, i.e. Defence Public Sector Undertakings (DPSUs) - HAL & BEL**.
- iDEX will **function as the executive arm of DIO**, carrying out all the required activities, while DIO will provide high-level policy guidance to iDEX.
- **Under iDEX, financial support is provided to Start-ups/MSMEs/individual innovators and Partner Incubators through DIO.**

Putin Claims Russia Successfully Tested a Nuclear-Powered Missile.

Burevestnik Missile

- The Burevestnik, whose **name translates as "storm petrel"**, is a **ground-launched, low-flying cruise missile** that is not only **capable of carrying a nuclear warhead** but is also **nuclear-powered**.
- The Burevestnik is **one of six strategic weapons that the Russian President introduced** in a 2018 speech.
- It is **code-named 'SSC-X-9 Skyfall' by NATO**.
- In theory, the **nuclear energy could let it fly around the world several times** before hitting its target.
- **Features:**
 - It is **powered by a small nuclear reactor**, which **heats up air to propel** the missile forward.
 - Its **nuclear propulsion gives the missile much longer range** than traditional turbojet or turbofan engines that are limited by how much fuel they can carry.
 - It has a **range of up to 14,000 miles (22000 km)**.
 - The missile is also **designed to fly at low altitudes**, much lower than a conventionally powered cruise missile, which would **make it harder for air-defence radar to detect**.

BlueWalker 3 satellite outshines most stars in the night sky

BlueWalker 3 satellite

- It is a prototype satellite, part **of a satellite constellation** planned by its owner AST SpaceMobile.
- It was one of the **brightest objects in the night** sky, outshining all the brightest stars.
- It was launched in September 2022.
- It is the **largest-ever commercial communications array** deployed in low-Earth orbit and is designed to communicate directly with cellular devices via 3GPP standard frequencies at 5G speeds.
- It uses wavelengths close to **those that radio telescopes** observe in, the satellite could also hamper radio astronomy.

Satellite constellation

- It is a **group of artificial satellites** working together as a system.
- Unlike a single satellite, a constellation can **provide permanent global or near-global coverage**, such that at any time everywhere on Earth at least one satellite is visible.
- Satellites are typically **placed in sets of complementary orbital planes** and connect to globally distributed ground stations. They may also use inter-satellite communication.

Territorial Army inducts first batch of Mandarin-trained officers along LAC

Territorial Army (TA)

- The Indian Territorial Army (TA) is a **second line of defence after the regular Indian Army**; it is **not a profession**, occupation or a source of employment.
- It is only **meant for those people who are already in mainstay civilian professions**; in fact, gainful employment or self-employment in a civil profession is a prerequisite for joining the TA.
- **Role:**
 - The duties of the TA include “**relieving the Regular Army from static duties**”, while also **providing assistance to civil authorities** in times of natural calamities and tragedies.
 - They also **help civil administration with providing essential services** in areas where state machinery is stretched or there **are security threats**.
- **Volunteers of the TA usually serve in uniform for a few days every year**, so that they can bear arms for national defence in times of dire need or national emergencies.
- **History:**
 - TA was **raised by the Britishers in 1920** through **Indian Territorial Act of 1920** and it was organised into **two wings namely - 'The**

'Auxiliary Force' for Europeans & Anglo-Indians and 'The Indian Territorial Force' for Indian Volunteers.

- **After Independence Territorial Army Act was passed in 1948** and the Territorial Army was formally inaugurated by the first Indian Governor General Shri C Rajagopalachari on 09 Oct 1949.
- **Motto: Savdhani Va Shoorta (Vigilance and Valour).**
- **Conditions of Eligibility:**
 - **Nationality: Citizens of India.** (Men & Women).
 - **Age: 18 to 42 years**
 - **Educational Qualifications: Graduate** from any recognized university
 - **Physical Standards:** A candidate must be **physically and medically fit** in all respects.
 - **Employment: Gainfully Employed**
 - **Serving member of the Regular Army/ Navy/ Air Force/ Police/ GREF/ Para Military and like forces are not eligible**

All about Israel's Iron Dome which took on 5,000 rockets launched by Hamas

Iron Dome

- It is **Israel's air missile defense system** that can defend **against short-range rockets**, intercepting them in the air above the state.
- It is capable of successfully **handling multiple rockets at a time.**
- **Developed by Rafael Advanced Defense Systems and Israel Aerospace Industries**, the system became **operational in March 2011.**
- **Features:**
 - The Iron Dome functions by **detecting, analyzing, and intercepting** varieties of **targets such as mortars, rockets, and artillery.**
 - It is **powered by missile-defense batteries.**
 - It has **all-weather capabilities** and is able to **function night or day** and in all conditions, including fog, rain, dust storms, and low clouds.
 - It is able to **launch a variety of interceptor missiles.**
 - It is designed to shoot down missiles with a **range of about 40 miles or less.**
 - It also **has the ability to be moved**, either onto ships or across land, to better suit defense needs.
 - It **must be reloaded to continuously intercept** incoming missiles.
 - The Iron Dome **operates through three main components:**
 - **a radar** that detects incoming rockets,
 - **a command-and-control system** that determines the threat level,
 - **an interceptor** that seeks to destroy the incoming rocket before it strikes.

Indian-origin NASA scientist to lead rocket mission to 'ring of fire' eclipse. Explained

Atmospheric Perturbations around the Eclipse Path (APEP) mission

- The mission will involve **launching of three rockets** equipped with scientific instruments.
- **Objective:** To know how **the upper atmosphere will change during the eclipse**, especially the moment when there would be a sudden reduction in light.
- During an eclipse, the **sudden drop in sunlight causes changes in the ionosphere**, creating waves that ripple through this atmospheric layer.
- It will measure changes in **electric and magnetic fields, density, and temperature**.
- This launch will take place at the **White Sands Missile Range in New Mexico**, with a specific focus on the ionosphere.
- According to NASA, the ionosphere's temperature and density are projected to decrease during the eclipse, resulting in a wave-like disturbance that has the potential to disrupt GPS and other satellite communications.
- **The process**
 - The rockets will be **positioned just outside the path of annularity**, where the Moon moves directly in front of the Sun. Each rocket will deploy **four small scientific instruments** designed to record changes in electric and magnetic fields, density, and temperature.
 - NASA's goal is to achieve the first-ever simultaneous measurements from multiple locations in the ionosphere during a solar eclipse.
 - Rockets can be launched precisely at the right moment and can investigate lower altitudes inaccessible to satellites.
 - Sounding rockets were chosen by the team due to their ability to **pinpoint and measure specific regions** of space with great accuracy.
 - These rockets can also record changes occurring at various altitudes as they ascend and descend from suborbital flights.
 - The rockets will **gather data at altitudes ranging from 45 to 200 miles** (70 to 325 kilometres) **above the Earth's surface** along their flight path.

IAF Chief unveils new Ensign as the force marks 91st anniversary

Indian Air Force (IAF) Ensign

- **Only the IAF Crest will be incorporated** into the new IAF Ensign.
- This crest prominently features the **national symbol, the Ashoka Lion, at the top**, with the **words "Satyamev Jayate" in Devanagari script** below it.
- **Beneath the Ashoka Lion is a Himalayan eagle with outstretched wings**, symbolising the fighting spirit of the IAF.

- **A ring in light blue colour encircles the Himalayan eagle with the words "Indian Air Force".**
- The **IAF motto, derived from the Bhagavad Gita, "Nabha Sparsham Deeptam",** meaning "**touching the sky with glory,**" is **inscribed below** the Himalayan eagle in golden Devanagari.
- IAF crest symbolises the source of **inspiration and encouragement.**
- IAF has **adopted various crests for commands, squadrons** and the other establishments.
- However, **all the crests follow a standard frame that** contains the individual formation sign with a motto shown in the scroll at the foot of the frame.
- **History:**
 - During the British era, **the Indian Air Force was known as the Royal Indian Air Force.**
 - Its **ensign consisted of the Union Jack in the upper left** canton and the **RIAF roundel (Red, White & Blue) on the fly side.**
 - **Post-Independence, the Indian Air Force ensign was created by replacing the Union Jack with the Indian tricolour and the RAF roundels with the IAF tri-colour roundel** in the lower right canton.

More than 1.3 crore school students participate in 'Veer Gatha Project 3.0'

Project Veer Gatha 3.0

- Project Veer Gatha was instituted under **Gallantry Awards Portal (GAP) in 2021.**
- **Aim:** To disseminate the details of acts of bravery of the Gallantry Awardees and the life stories of these brave hearts among the students so as to **raise the spirit of patriotism** and instil amongst them values of civic consciousness.
- As part of this, the students framed different projects through various media like art, poems, essays and multimedia on these gallantry award winners and best projects were awarded at national level by **the Ministry of Defence and the Ministry of Education.**
- **Under the Veer Gatha Project 3.0,** following activities have been conducted
 - **Activities at the School Level:** Schools have conducted various projects/activities and have uploaded a total of 04 best entries from each school, on the MyGov portal.
 - Simultaneously, to bring about awareness among school students about the Gallantry Award Winners of our country, the Ministry of Defence, through its field organisations or Army/Navy/Airforce, has organized virtual/ face-to-face awareness programmes/sessions for schools across the country.

Gallantry Awards

- They have been instituted by the Government of **India to honour the acts of**

bravery and sacrifice of the officers/personnel of the Armed Forces, other lawfully constituted Forces and civilians.

- These gallantry awards **are announced twice a year** first on the occasion of **the Republic Day** and then on the occasion of the **Independence Day**.
- Three gallantry awards, namely Param Vir Chakra, Maha Vir Chakra and Vir Chakra, were instituted by the Government of India on 26th January, 1950.
- Thereafter, the other three gallantry awards, i.e. the Ashoka Chakra Class-I, the Ashoka Chakra Class-II and the Ashoka Chakra Class-III were instituted in 1952.
- These awards were renamed **Ashoka Chakra, Kirti Chakra and Shaurya Chakra**, respectively, in 1967.
- **Order of precedence:** The order of precedence of these awards is the Param Vir Chakra, the Ashoka Chakra, the Mahavir Chakra, the Kirti Chakra, the Vir Chakra and the Shaurya Chakra.
- All the gallantry awards **may be awarded posthumously**.

Annual joint hadr exercise 2023 – (chakravat 2023)

CHAKRAVAT

- It is an **Annual Joint Humanitarian Assistance and Disaster Relief HADR Exercise** (AJHE)
- Since its first edition in 2015, the Annual Joint HADR Exercise, CHAKRAVAT has transformed itself into a multi-agency endeavour.
- It involves participation of **all three Services, Paramilitary Forces**, as well as several disaster response organisations, NGOs, academic institutions and international organisations.
- The 2023 edition would further synergise efforts at the national level among all stakeholders, as well as witness participation **from eight countries of the Indian Ocean Region**.
- The exercise has been conducted by the Indian Army, Indian Navy (IN) and Indian Air Force (IAF) in rotation since 2016.
- The 2023 edition of the **exercise is being hosted by the Indian Navy at Goa**.
- The exercise will witness participation from various national agencies namely, National Disaster Management Authority (NDMA), National Disaster Response Force (NDRF), National Institute for Disaster Management (NIDM), Indian Army, Indian Navy, Indian Air Force, Coast Guard, Indian Metrological Department (IMD) and other organizations.
- **Logo of the event:** The Logo for this year's exercise depicts crests and logos of all participating agencies and flags of all nations subsumed into one single entity to signify that HADR will hinge on joint and integrated action by the all the agencies.

Israel Accused of Using White Phosphorous in Gaza, Lebanon

White Phosphorous Bombs

- White phosphorus is a **waxy, yellowish-to-clear chemical** with a **pungent, garlic-like odour**.
- It is a **highly combustible chemical that burns quickly** and brightly **when exposed to air**.
- It is **used in incendiary weapons by militaries** around the world for a variety of purposes, such as **illuminating targets at night** or to **inflicting damage on enemies**.
- It **burns at a temperature of 800°C** and **spontaneously ignites** at up to 1,300 degrees Celsius **when it is exposed to oxygen**, and **producing white, dense smoke**, which **is used by armies to create smokescreens** in sensitive zones.
- White phosphorus can **cause fast-moving and widespread fires on the ground**.
- **Once ignited**, the substance is **very difficult to put out**, as it **clings to many surfaces, including skin** and clothing.
- Since it is a wax-like substance, it is **very hard to remove** and often **lights up again when the bandages are removed**.
- White phosphorus munitions are **not banned under international law**, but because of their **incendiary effects**, their use is supposed to be tightly regulated.
- **Examples of White Phosphorous usage in wars:**
 - The **British army** used it in **both World Wars**.
 - **US forces, after invading Iraq**, used the chemical weapon against insurgents in the city of Fallujah.
 - **Israel admitted that it used** phosphorus shells **during the battle against Hezbollah** during the 2006 Lebanon War.

Incendiary weapons

- They are weapons or **munitions designed to set fire** to objects **or cause burns or respiratory injuries** to people through the **action of flame, heat, or a combination thereof, resulting from a chemical reaction of a flammable substance** such as napalm or white phosphorus.
- **In 1972, the United Nations General Assembly passed a resolution** calling **incendiary weapons a "category of arms viewed with horror."**
- The definition in Article 1 of Protocol III of the **Convention on Certain Conventional Weapons excludes multipurpose munitions**, particularly those **containing white phosphorus**.
- Because **white phosphorus has legal uses, shells filled with it are not directly prohibited** by international humanitarian law.

“Starquakes” could explain mystery signals

Fast Radio Bursts

- A fast radio burst is a **bright and brief burst of electromagnetic radiation** (light) seen in radio-wave frequencies.
- They usually last for **very short period of time**.
- Some FRBs repeat, but the vast majority happen once and disappear forever.
- They reach earth **from faraway galaxies**, emitting as **much energy** in a millisecond as the **sun does over weeks**.
- Scientists don't know for sure what causes fast radio bursts.
- However, the current prevailing theory is that at least some FRBs are emitted by **neutron stars**.
- These stars form when a supergiant star collapses, going from eight times the mass of our sun (on average) to a superdense core only 20–40 kilometers across.
- **Magnetars are neutron** stars with extremely strong magnetic fields, and these have been observed to emit FRBs.

What recent study says?

- Previous studies have **noted broad similarities between** the energy distribution of **repeat FRBs, and that of earthquakes and solar flares**.
- However, new research at the University of Tokyo has looked at the time and energy of FRBs and found distinct differences between FRBs and solar flares, **but several notable similarities between FRBs and earthquakes**.

What is Jericho missile system? Israel's potential 'doomsday' nuclear option

Jericho Missile System

- Jericho is **Israel's original ballistic missile programme, initiated in the 1960s** and named after the biblical city located in the West Bank.
- This programme was **initially a collaboration with the French** aerospace company Dassault, but when **France withdrew in 1969, Israel continued** its development.
- **Jericho-1:**
 - It had a weight of **6.5 tonnes**, a **length of 13.4 metres**, and a **diameter of 0.8 metres**.
 - It had a **range of 500 kilometres** and could **carry a 1,000-kilogram payload**, though it had a 50 percent chance of hitting within a 1,000-metre radius of its target.
 - It was **retired in the 1990s**.
- **Jericho-2:**
 - It was **developed in the late 1980s**, with a **length of 15 metres** and a

diameter of 1.35 metres, while maintaining the **same payload capacity**.

- It had a **range between 1,500 and 3,500 kilometres**.
- **Jericho-3:**
 - It is the first **Israeli Intercontinental Ballistic Missiles (ICBM)**.
 - It was first **tested in 2008** and **entered service in 2011**.
 - It featured improvements over the previous models, with a **longer length than Jericho-2 and a larger diameter of 1.56 metres**.
 - It has an estimated **launch weight of 29,000 kg** and a **payload of 1,000 to 1,300 kg**.
 - It has a **range of 4,800 to 6,500 km** and uses **inertial guidance** with a **radar-guided warhead**.
 - The missile is reportedly equipped with a **750-kg nuclear warhead**.

Defence Ministry Seals Rs 313 Crore Deal For Upgrade Of Warship INS Beas

- It is the **first Brahmaputra Class Frigate** to be **re-powered from steam to diesel propulsion**.
- After completion of Mid Life Upgrade and Re-Powering in 2026, INS Beas will join the active fleet of the Indian Navy, with a modernised weapon suite and upgraded combat capability.

INS Beas

- INS Beas (**F37**) is a **Brahmaputra-class frigate of the Indian Navy**.
- It was **built at the Garden Reach Shipbuilders and Engineers (GRSE), Kolkata**.
- It was **commissioned on 11th July, 2005**.
- It is the **second ship** in the Indian Navy **to bear the name**. The first was a Leopard-class frigate commissioned in 1960 and scrapped in 1992.
- **Role:** It is a **versatile warship** capable of a range of missions, including **anti-aircraft, anti-submarine, and anti-ship warfare**. It is also used for patrolling, surveillance, and providing security to India's maritime interests.
- **Features:**
 - The **design and construction** of the ship **are entirely Indian** and are a modification of the Godavari-class frigate.
 - It has a **displacement of about 3,850 tonnes**.
 - The ship has a **length of 126 metres** (413 feet) and a **beam width of 14.5 metres** (48 feet).
 - **Propulsion: 2 steam turbines**
 - It is capable of reaching **speeds of over 30 knots**, making it swift and agile in naval operations.
 - It is fitted with an array of **modern sensor suites and matching weapon systems**.

For the first time, an AI system discovers supernova without human intervention

Bright Transient Survey Bot

- It is a **machine-learning algorithm** which has been trained by using over 1.4 million images from nearly 16,000 sources.
- It detected the newly **discovered supernova named SN2023tyk** in data from the Zwicky Transient Facility (ZTF)
- **How does it work?**
- It automatically **requested the potential supernova's spectrum from Palomar Observatory**, where another robotic telescope, the Spectral Energy Distribution Machine (SEDM), performed an in-depth observation to obtain the source's spectrum.
- This new system not only allows automation of the entire search for new supernovae across the night sky but also **eliminates human error and dramatically increases speed**.
- It searched, detected, confirmed, classified, and announced the findings without any human intervention

Artificial intelligence

- Artificial intelligence (AI) refers to the **simulation or approximation of human intelligence in machines**.
- The goals of artificial intelligence include computer-enhanced learning, reasoning, and perception.
- AI is being used today across different industries, from finance to healthcare.

'Iron Beam': Israel's deadly laser tech can be used against Hamas' missiles; how it works

Iron Beam

- The Iron Beam, also known as **Magen or Light Shield**, is a new **laser-based missile defence system developed by Israel**.
- It is a **directed-energy weapon** air defence system that **fires powerful beams of light** that can **destroy fast-moving projectiles**.
- **Built by Rafael Advanced Defense Systems**, Iron Beam was first **unveiled in 2014**.
- The system can **intercept hostile rockets, drones, artillery**, and even mortar shells.
- Its operational **range extends up to 7 km (4.3 miles)**.
- **Advantages:**
 - With a **continuous energy supply** for the laser, the advantage lies in **never depleting ammunition**, ensuring a sustained capability for

- defence.
- The **absence of conventional ammunition** will directly result in **significant cost savings**.
- **Disadvantages:**
 - **Diminished effectiveness during restricted visibility**, such as heavy cloud cover or adverse weather conditions.
 - It **cannot operate effectively in wet conditions**—the more moisture in the atmosphere, the more water particles absorb the laser's energy.
 - Iron Beam **requires a direct line of sight** between the system and its target, making its placement far more critical.
 - It also has a **much slower rate of fire**, requiring five seconds or so to transmit sufficient energy to destroy its target.

Gaganyaan Mission: ISRO To Conduct TV-D1 Flight Test

TV-D1 Mission

- Test Vehicle Abort Mission-1 (TV-D1) will evaluate the **crew module's readiness** for the Gaganyaan mission.
- It is a **single-stage liquid rocket developed** specifically for this abort mission.
- The payloads consist of the **Crew Module (CM)** and **Crew Escape Systems (CES)** with their fast-acting solid motors, along with CM fairing (CMF) and Interface Adapters.
- This flight will simulate the abort condition during the ascent trajectory corresponding to a **Mach number of 1.2** encountered in the Gaganyaan mission.

What is the test all about

- The abort and crew escape system operates on a similar principle to an ejection seat found in fighter jets, with the primary goal of safeguarding the lives of crew members in the event of in-flight anomalies.
- The **Crew Escape System** is engineered to automatically function across various altitudes should the onboard computer detect any malfunctions.
- This test flight will simulate an abort condition during the ascent trajectory.
- **Objective:** To test a crucial system to be **deployed on the Gaganyaan mission** that will ensure the safety of the Indian astronauts in case of an emergency in the initial phase of the launch.
- CES with CM will be separated from the Test Vehicle at an altitude of about 17 km.
- Subsequently, the abort sequence will be executed autonomously commencing with the separation of CES and deployment of the series of parachutes, finally culminating in the safe touchdown of CM in the sea, about 10 km from the coast of Sriharikota.

Is Halley's Comet returning?

Orionid meteor shower

- It is an annual phenomenon that lights up the night sky every October.
- It is produced when Earth passes through the **debris left behind by Halley's Comet**, officially known as **1P/Halley**.
- This comet, which orbits the sun approximately every 76 years, expels dust particles from its nucleus, creating a trail of debris in its path.
- Each year, our planet intercepts this path in late October, resulting in the Orionid meteor shower.
- Halley's Comet, measuring about five by nine miles in size, loses between three to ten feet of material on each passage through the inner solar system.
- The Orionids are **viewable in both the Northern and Southern hemispheres** during the hours after midnight.

Meteor

- When **meteoroids enter Earth's atmosphere** at high speed and burn up, the fireballs or "shooting stars" are called meteors.
- Meteor showers occur annually or at regular intervals as the Earth passes through the trail of dusty debris left by a comet.
- Meteor showers **are usually named after a star or constellation** that is close to where the meteors appear in the sky.

ART & CULTURE

PM offers prayers at temple in Rajasthan's Chittorgarh

Sanwariya Seth Temple

- It is a **Hindu temple dedicated to Lord Krishna**, specifically to his **beloved child form known as "Sanwariya Seth" or "Shyam Seth."**
- **Location:** It is located in the village of Mandaphia in the **Chittorgarh district of Rajasthan.**
- It was **built in 1840 A.D.**
- **Architecture:**
 - The temple follows the **traditional architecture of Rajasthan**, known for its **intricate carvings, domes, and vibrant colors.**
 - The **main structure** of the temple is **built using white marble.**
 - The temple is adorned with **intricate carvings on the walls, pillars, and ceilings.** These carvings **depict scenes from Hindu mythology** and various motifs.
 - The temple **features multiple domes** that are adorned with decorative elements.
 - The temple has a **prominent spire, or shikhar**, which is a tall, **tapering structure that rises above the main sanctum.**
 - In the **sanctum sanctorum of the temple**, a **black stone idol of Lord Krishna is installed.**
 - The temple **has spacious pillared halls that provide a gathering space** for devotees and visitors.

Largest Paleolithic Cave Art Site Is Discovered in Eastern Iberia

Paleolithic Period

- It was the period ranging from **2.6 million years ago to 10,000 years ago.**
- The name Paleolithic was **coined by the famous archeologist John Lubbock in the year 1865.**
- It **began with the first use of stone tools by hominins** (human-like creatures) and **ended with the onset of the Mesolithic Period around 11,650 years ago.**
- It has been **classified into upper, middle, and lower Paleolithic periods** due to the growth that was experienced by the human species over time.
 - **Lower or Early Palaeolithic:** From **2.6 million-250,000 years ago**, **simple pebble tools and crude stone** choppers were made by the earliest humans.
 - **Middle Palaeolithic:** From **250,000 years ago**, with a new **focus on flake-tools**, which continued to be popular in certain areas **until as late as c. 30,000 years ago.**

- **Upper or Late Palaeolithic (40,000–10,000 BC):** It saw a **huge proliferation with regard to both tool shapes and source materials** (now also a lot of bone, antler, and ivory).
- **Social Organisation:**
 - The human societies of the Paleolithic age are recorded to have **lived without any form of organized state or government.**
 - Palaeolithic is also more generally associated with the cultures and **lifestyles of the hunter-gatherers.**
 - **Middle and upper Paleolithic human societies lived together in groups of 25-100 members, and they were nomads.**
 - **At the end of the Paleolithic age, families started to settle down to cultivate land and trade with neighbors.**
- **Religions and Beliefs:**
 - The development of any form of **spiritual or religious belief in human evolution started during the Paleolithic age.**
 - The **middle Paleolithic human species created burial sites, and defleshing rituals** led anthropologists and archaeologists to **conclude that they believed in an afterlife.**

Mesolithic Period

- It is **also called the Middle Stone Age** which existed **between the Paleolithic (Old Stone Age) and the Neolithic (New Stone Age).**
- **Timeframe:** This period is generally considered to have occurred between approximately **12,000-10,000 years ago.**
- **Lifestyle:** During the Mesolithic period, human societies were **predominantly hunter-gatherer communities.**
- People **relied on hunting, fishing, and gathering** wild plant resources for their sustenance.
- **Stone tools found during this period are generally tiny, and are called microliths.**
- Microliths were **probably stuck onto handles of bone or wood** to make tools such as saws and sickles.
- At the same time, **older varieties of tools continued to be in use.**

First public sector caravan park in Kerala to come up at Bekal

Bekal Fort

- It is exquisitely designed and built **with dark maroon laterite stones.**
- It is the largest and best preserved Fort in the whole of **Kerala.**
- The fort is endowed with impressive **walls and ramparts** which are again interrupted by **massive bastions.**
- While the bastions are equipped with several large and small openings for guns, the walls are interspersed with windows and peepholes. These were used to spot the enemy from afar in the past

- A unique and eye-catching feature is a lone bastion, projecting out into the sea.
- It was built in **the 17th century**.
- This historic monument offers a superb view of the Arabian Sea from its tall observation towers, which were occupied by gigantic cannons till a few centuries ago.
- **Originally constructed by** the rulers of the ancient **Kadamba Dynasty**, the Fort changed hands over the years to the Kolathiri Rajas, the Vijayanagara Empire, Tipu Sultan and finally, the British East India Company.
- The most prominent structure inside the fort is the **observation tower** built by Tipu Sultan.

Mangaluru: Stone inscription related to Kulashekara Alupendra's death found at Someshwara temple

Someshwara inscription

- This inscription is very significant in the study of **Tuluva history and culture**.
- It has two panels on the top, and in between the two panels, the first line is engraved.
- The rest of the inscription written below **the panels is in Kannada script** and the language of 12th century characters announcing the death of Alupendra I.
- The human figures shown in the inscription **represent Kulashekara Alupendra himself**.
- In the first figure, he is **shown standing in Tribhanga** (tri-bent posture). He holds a sword in his right hand while the left hand rests on a gurani (shield).
- To the left of this panel, divided by a pillar, the King is again **shown in a sitting posture** on a mound, resting both his palms on the centre of his legs in dhyana mudra.

Kulashekara Alupendra

- Kulashekara Alupendra I was a famous ruler of the **Alupas of South Canara**.
- He was responsible for the **establishment of a new city called Kulashekara in Mangaluru**.
- He also laid down strict rules and regulations for temple administration, which are still followed in all temples in this region.
- He was the first ruler to give **royal patronage to Tulu language and culture**, ruling from both the capitals, Mangaluru and Barkuru.
- Alupendra I **ruled Tulunadu from 1156-1215 A.D.**, as known from his other records.
- Though the present inscription is undated, it is datable to 12th century on the basis of paleography.

36 held after violent clash at Bhimashankar temple

Bhimashankar Temple

- It is an ancient **Hindu shrine dedicated to Lord**
- **Location:** It is located in the **Sahyadri hills** in the **Pune District of Maharashtra**.
- It is considered **one of the 12 holy Jyotirlinga shrines** in India.
- In recent times, Bhimashankar has gained tremendous significance since it was **declared a "Wildlife Sanctuary"**. This sanctuary is a **part of the Western Ghats**.
- Bhimashankar is the **source of the river Bhima**.
- **History:**
 - It was **built around the 13th century**. It is a testament to the **skills of the Vishwakarma sculptors**.
 - Structures such as the **shikhara (spires)** were **added by Maratha Empire statesman Nana Phadnavis in the 18th century**.
 - The Maratha ruler, **Chhatrapati Shivaji Maharaj**, is also believed to have **facilitated worship here** through his endowments.
- **Architecture:**
 - It is a composite of old and new structures in the **Nagara style of architecture**.
 - The temple features **huge court spaces, intricate carvings on walls, and colossal pillars**.
 - The sanctum of the temple, called **Garbhgriha**, has been **constructed at a lower level inside** which the sacred Jyotirlinga is present.
 - The **Swayambhoo, or self-emanated Shiv Linga, is precisely in the center of the floor of the Sanctum Sanctorum**.
 - The **massive pillars and doorframes** of the temple are **awash with exquisite mythological carvings** of divine figures and holy symbols.
 - The temple also **houses an ancient shrine of Lord Shani** which is considered very auspicious by the devotees.
 - The **statue of Nandi**, the revered bull who's the vehicle of Shiva, **is present right at the entrance of the temple**.

Jyotirlingas

- A Jyotirlinga is a shrine **where Lord Shiva is worshipped in the form of a Jyotirlingam**.
- There are currently **12 main Jyotirlingas in India**.
- The 12 Jyotirlinga temples in India **take the name of the presiding deity**. **Each considered a different manifestation** of Lord Shiva.
- **12 Jyotirlingas in India are:**
 - **Somnath** Jyotirlinga in Gir, Gujarat
 - Mallikarjuna Jyotirlinga in Srisailem, Andhra Pradesh
 - **Mahakaleshwar** Jyotirlinga in Ujjain, **Madhya Pradesh**

- **Omkareshwar** Jyotirlinga in Khandwa, **Madhya Pradesh**
- Baidyanath Jyotirlinga in Deoghar, Jharkhand
- **Bhimashankar Jyotirlinga in Maharashtra**
- Ramanathaswamy Jyotirlinga in Rameshwaram, Tamil Nadu
- Nageshwar Jyotirlinga in Dwarka, Gujarat
- **Kashi Vishwanath** Jyotirlinga in Varanasi, **Uttar Pradesh**
- Trimbakeshwar Jyotirlinga in Nasik, Maharashtra
- **Kedarnath** Jyotirlinga in Rudraprayag, Uttarakhand
- Ghrishneshwar Jyotirlinga in Aurangabad, Maharashtra

SOCIETY

President of India presents National Service Scheme Awards

National Service Scheme Awards

- These awards were instituted in **the years 1993-1994**. Since then, these awards are given away every year at various levels.
- Ministry of Youth Affairs & Sports, Department of Youth Affairs, confers **every year the National Service Scheme Award**.
- **Objectives**
 - To recognize **outstanding contribution by NSS student volunteers**, NSS Programme Officers and the Programme Coordinators in community service.
 - To encourage young NSS student volunteers to develop their personality through community service.
 - To **encourage the Programme Officers and the Programme Coordinators** of NSS for catering the needs of National Service Scheme through the NSS volunteers.
 - To motivate NSS Volunteers for continuing their selfless service towards community work.

National Service Scheme

- It is a **Central Sector Scheme** of the Government of India.
- It provides an opportunity to the student youth of the 11th & 12th Class of schools at +2 Board level and student youth of Technical Institution, Graduate & Post Graduate at colleges and University level of India to take part in **various Government led community service activities & programmes**.
- **Motto:** The motto of National Service Scheme **is NOT ME BUT YOU**
- **Nodal Ministry:** Ministry of Youth Affairs & Sports.

Jammu and Kashmir's famed Pashmina gets geographical recognition with GI tag

Basohli Pashmina

- It is a **hand-spun product known for extreme softness**, fineness and light-weight, has insulating properties and extended life.
- Pashmina products include shawls for both men and women, mufflers, blankets and basket.
- Pashmina refers to a **fine variant of spun cashmere** (the animal-hair fibre), that is derived from the downy undercoat of the Changthangi.
- It is obtained from a **breed of mountain goats** (*Capra hircus*) found on the Changthang Plateau in Tibet and parts of Ladakh.

- A traditional producer of pashmina wool in the Ladakh region are a people known as **the Changpa** (nomadic people inhabit the Changthang plateau of Tibet).

Geographical Indication Tag

- It is a sign used on products that have a **specific geographical origin** and possess qualities or a reputation that are due to that origin.
- This is typically used for agricultural products, foodstuffs, wine and spirit drinks, handicrafts and industrial products.
- The Geographical Indications of **Goods (Registration and Protection) Act, 1999** seeks to provide for the registration and better protection of geographical indications relating to goods in India.
- This GI tag is **valid for 10 years** following which **it can be renewed**.

Andhra Pradesh's Bojjannakonda gets major facelift to draw more tourists

Bojjannakonda

- It is located in the state of Andhra **Pradesh**.
- The site was **excavated** under the aegis of **Alexander Rim in 1906**.
- It was **originally known as 'Buddhuni konda'** (hill of the Buddha), but it came to be known as 'Bojjannakonda' in the course of time.
- Buddhist monks used to practice on the hill about 2,000 years ago.
- A gold coin belonging to the **Samudra Gupta** period, copper coins of the **Chalukya king** Kubja Vishnu Vardhan, coins of **Andhra Satavahanas** and pottery were discovered at the site.
- **Features**
 - An interesting feature of this site is that it shows features of **all the three phases of Buddhism: Hinayana, Mahayana and Vajrayana**.
 - A figure of 'Kalabhairava' with the head of Lord Ganesha wearing conch shells and the statue of a Buddhist monk, 'Harati', have also been found at the site.
 - There is a large **double-storeyed cave** on the hill.
 - The rectangular cave has a doorway and is flanked by 'dwarapalakas' on either side.
 - There is a **rock-cut stupa**, standing on a square platform, at the centre of the cave.
 - A series of **rock-cut caves** and **monolithic structures** standing on rock platforms are present on the northern side of the hill.
 - The upper cave has a rectangular doorway flanked by figures of the Buddha on either side.
 - The imposing figures of the **Buddha, seated in meditation posture**, and the stupa are the main attraction for tourists at Bojjannakonda.
 - On the top of the hill, there is a group of structural **buildings and a vihara** (monastery), which has been reduced to ruins.

- **To the west of Bojjannakonda**, another hillock, **Lingalakonda or Lingalametta**, is present.
- A number of monolithic and structural stupas can be seen on the top of this hillock.
- The Buddhist temple at Barabodur in Java has been constructed on the lines of the structures on Lingalametta”.
- The caves at Bojjannakonda and those in **Takshasila** are similar.
- The word ‘Sangrama’ was in use at Takshasila but was never used in Andhra Pradesh. These two features suggest that Buddhist practices influenced Bojjannakonda in northern India,”

Karnataka distributes title deeds to 114 Hakki Pikki, Iruliga tribal people

Hakki Pikki Tribe

- Hakki Pikkis (Hakki in Kannada means ‘bird’ and Pikki means ‘catchers’) are a **semi-nomadic tribe, traditionally of bird catchers and hunters**.
- It is one of the **major tribal communities in Karnataka**. They also reside in **the Western and Southern states** of India, mostly **near forest areas**.
- The community **migrated from Northern India, mainly Gujarat and Rajasthan**, and is now mainly concentrated in Shivamogga, Davanagere, and Mysuru district of Karnataka.
- They are **recognized as a Scheduled Tribe in India**.
- **Occupation:**
 - After the implementation of stricter wildlife laws, the **tribe changed its occupation from hunting to selling spices, flowers, Ayurveda formulations**, and herbal oils.
 - They now **travel globally to sell these products, especially in the African continent**, where there is a demand for cheaper alternatives to Western medicine.
- **Language:**
 - Despite being surrounded by Dravidian languages and living in southern India, the **community speaks an Indo-Aryan language**.
 - Their mother tongue was **designated as 'Vaagri' by scholars**.
 - **UNESCO has listed 'Vaagri' as one of the endangered languages**.
- **Rituals and customs:**
 - The tribe **follows Hindu traditions** and celebrates Hindu festivals.
 - The tribe **prefers cross-cousin marriages**. The **society is matriarchal**, where the **groom gives dowry to the bride's family**.
 - The **eldest son in a family is not supposed to cut his hair** so that he can be identified easily.
 - They are **non-vegetarians**.

How Chhatrapati Shivaji Maharaj killed Afzal Khan with his 'Wagh Nakh'

Chhatrapati Shivaji Maharaj's 'wagh nakh' will be brought back to Maharashtra from a London museum. Literally 'tiger claws', the wagh nakh is a mediaeval claw-like dagger which was used across the Indian subcontinent. Designed to either fit over the knuckles or be concealed under the palm, the weapon consisted of four or five curved blades affixed to a glove or a bar of some kind. It was a weapon used for personal defence or stealth attack, and could easily slice through skin and flesh.

Chhatrapati Shivaji Maharaj

- He was the **founder of the Maratha Empire** in western India.
- He was **born on February 19, 1630, to Shahaji Bhosle and Jijabai** in the fort of Shivneri, **near the city of Junnar in the Pune district, Maharashtra.**
- With his valor and **great administrative skills**, Shivaji **carved out an enclave from the declining Adilshahi sultanate of Bijapur.** It eventually **became the genesis of the Maratha Empire.**
- After establishing his rule, Shivaji **implemented a competent and progressive administration** with the help of a **disciplined military** and a **well-established administrative set-up.**
- He was known as the **Father of the Indian Navy.** Shivaji was the **first to realise the importance of having a naval force**, and therefore he strategically **established a navy and forts at the coastline** to defend the Konkan side of Maharashtra.
- He was **called the 'Mountain Rat'** and was widely **known for his guerrilla warfare.** He was called so because of **his awareness of geography of his land and guerrilla tactics like raiding, ambushing,** and surprise attacks on his enemies.
- He was a **secular ruler** who was very accommodating of all religions. He had **numerous Muslim soldiers in his army.**
- Shivaji was a **dependable supporter of women and their honour.** Anyone under his rule caught violating woman's rights was severely punished.
- He had a **council of ministers (Asht Pradhan) to advise him** on the matters of the state, **but he was not bound by it.**

First-Ever Yak Milk Product Receives Coveted GI Tag

Yak churpi

- It is a dairy product made from the milk of the **indigenous Arunachali yak breed.**
- It is reared by **tribal yak pastoralists known as Brokpas** who migrate along with their yaks to higher reaches (at an altitude of 10,000 ft and higher) during summers and descent to mid-altitude mountainous regions during winters.

- These remarkable yaks are primarily found in the **West Kameng and Tawang districts** of the state.
- Churpi is a naturally fermented dairy product and **rich in protein content**.
- It is an **essential dietary staple** for tribal communities inhabiting the cold and mountainous regions of Arunachal Pradesh.
- It is often used as a vegetable substitute and is also incorporated into vegetable and meat curries and is commonly consumed with rice.
- This GI tag is going to serve the cause of **yak conservation** and yak pastoralists' socio-economic upliftment.
- Yaks are reared in high altitude areas in the Himalayan region but the Arunachali yaks are a unique breed in respect to their body shape, size, strain and weight.
- Arunachali yaks are also the **only registered yak breed in India**

Pythagoras did not discover famed theorem! Babylonian tablet unearths plagiarism

The revelation comes from translating an ancient Babylonian clay tablet, designated as YBC 7289, dating back to 1800-1600 BC.

Ratner recently examined the ancient Babylonian tablet that employs the principles of the Pythagorean theorem to calculate the length of a rectangle's diagonal, thus indicating that the theorem was in circulation much before Pythagoras's era.

Pythagoras

- Pythagoras was a **Greek philosopher and mathematician**.
- Pythagoras lived during the **6th century B.C.** on the **island of Samos, Greece**.
- He is commonly said to be the **first pure mathematician who proposed that everything is a number**.
- He is best known in the modern day for the **Pythagorean Theorem**.
- **Pythagoras' Theorem:**
 - It states that **in a right-angled triangle, the square of the length of the hypotenuse** (the side opposite the right angle) **is equal to the sum of the squares of the lengths of the other two sides**.
 - This formula has been **applied to measuring distance and space** as, for example, in planning and executing the construction of a building.
- Pythagorean Brotherhood:
 - Pythagoras founded a **secretive** religious and philosophical community known as the Pythagorean Brotherhood.
 - The **members, known as Pythagoreans**, followed a **strict set of rules and beliefs**, including the **idea that mathematics and numbers held mystical and spiritual significance**.
 - It was here he **taught that "the whole cosmos is a scale and a**

number.

Udangudi Panangarupatti gets GI tag Thoothukudi district

Udangudi Panangarupatti

- The palm jaggery preparation procedure in this area is traditional till date **without inclusion of any additional modern strategies.**
- **Uniqueness:**
 - The karupatti prepared from the palm sap from the region around Udangudi in Tiruchendur taluk in Thoothukudi district has some uniqueness.
 - This is due to the presence of **red sand dune soil found in the region.**
 - This **soil holds less groundwater.** The moisture content in the atmosphere is less because of the dry climatic condition, which leads to high sucrose content, in turn adding taste.
 - The region's dry climate is also suitable for storage of karupatti for a longer duration.
 - **No chemical additives** like Triple super phosphate and phosphoric acid are used in its preparation.

Geographical Indication (GI) tag

- It is a sign used on products that have a **specific geographical origin** and possess qualities or a reputation that are due to that origin.
- This is typically used for **agricultural products, foodstuffs, wine and spirit drinks**, handicrafts and industrial products.
- The Geographical Indications of **Goods (Registration and Protection) Act, 1999** seeks to provide for the registration and better protection of geographical indications relating to goods in India.
- This GI tag is **valid for 10 years** following which it can be renewed.

Govt mulling incentives for ASHA workers to mobilise individuals for sickle cell disease screening

Accredited Social Health Activist (ASHA)

- ASHA is a **trained female community health activist.**
- ASHA workers are a **core part of the National Rural Health Mission** launched by the Government of India.
- **Selected from the community itself** and accountable to it, the ASHA will be **trained to work as an interface between the community and the public health system.**
- **Functions:**

- Act as a **care provider at the community level**.
- **Facilitating access to healthcare**, medicine, and sanitation services.
- **Raising the level of awareness** of health issues among the marginalised sections within the community.
- **Advocate for female health** and hygiene standards.
- **Advocate for a health-conscious behaviour** and approach to livelihood.
- The ASHA scheme is **presently in place in all States/UTs (except Goa)**.
- The states are **mandated to employ at least one ASHA worker per every 1000 people**.
- They are **chosen through a rigorous process of selection involving various community groups, self-help groups**, Anganwadi Institutions, Block Nodal officer, **District Nodal officer**, the village Health Committee **and the Gram Sabha**.
- The **States have been given the flexibility to relax the population norms** as well as the **educational qualifications** on a case to case basis, **depending on the local conditions** as far as her recruitment is concerned.
- **Selection Criteria:**
 - **In rural areas**, ASHA must primarily be a **woman resident of the village married/ widowed/ divorced**, preferably in the **age group of 25 to 45 years and literate preferably qualified up to 10th standard** (formal education up to Class 8).
 - **In urban areas**, ASHA must be a **woman resident of the "slum/vulnerable clusters"** and **belong to that particular vulnerable group** which have been identified by City/District Health Society for selection of ASHA, and must have **good communication and leadership skills**.
- **Compensation for ASHA:**
 - An ASHA worker is primarily an **"honorary volunteer"** but is **compensated for her time in specific situations** (such as training attendance, monthly reviews, and other meetings).
 - On an average, an ASHA worker's **monthly income varies from Rs 2,000 per month to Rs 7,000 per month, depending on the state**.
 - In addition, she is **eligible for incentives offered under various national health programmes**.
 - She would also have **income from the social marketing of certain healthcare products** like condoms, contraceptive pills, sanitary napkins, etc.

Chhattisgarh Baiga tribe gets habitat rights under FRA

Baiga Tribe

- The Baiga Tribe is one of the **Particularly Vulnerable Tribal Groups (PVTGs)**.
- They reside in Chhattisgarh, Jharkhand, Bihar, Odisha, West Bengal, Madhya

Pradesh and Uttar Pradesh.

- **Occupation:** Traditionally, the Baiga lived a semi-nomadic life and practised slash-and-burn cultivation. Now, they are mainly dependent on minor forest produce for their livelihood.
- They practice a form of **shifting cultivation called, "Bewar."**
- **Mahua** is an important aspect of **Baiga's food and drink**. It is an intoxicant prepared from the fermentation and distillation of the flowers of the Mahua tree.
- **Tattooing is** an integral part of Baiga culture, every age and body part has a specific tattoo reserved for the occasion.

Habitat rights

- Habitat rights recognition provides the community concerned rights over their **customary territory of habitation, socio-cultural practices**, economic and livelihood means, intellectual knowledge of biodiversity and ecology, traditional knowledge of use of natural resources, as well as protection and conservation of their natural and cultural heritage.
- These rights **safeguard and promote traditional livelihood** and ecological knowledge passed down through generations.
- They also help converge different government schemes and initiatives from various departments to empower PVTG communities to develop their habitats.
- These rights are given under section 3(1) (e) [rights including community tenures of habitat and habitation for primitive tribal groups and pre-agricultural communities] of **The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** also known as **the Forest Rights Act (FRA)**.

Geographical indication (GI) tag for Goan cashew (kernel)

Goan cashew

- Cashew is one of the most important **plantation crops in India**
- Cashew was **native to northeast Brazil** in Latin America and was introduced to Goa by the Portuguese in the 16th century (1570).
- At the time of its introduction on Indian coasts, cashew was known mainly as a crop for afforestation and soil conservation.
- In the state of Goa, it occupies the largest area among horticultural crops.
- **Climatic condition**
 - **Soil and climate: Well-drained deep sandy loam soils** are the best for growing cashew. In general, all soils from sandy to laterite are well suited for this crop.
 - It is very well adapted to Indian coastal area under hot humid conditions
 - **Temperature:** In the range of 20 to 38 °C, relative humidity in the range of 60 to 95%.

- **Rain fall:** Annual precipitation in the **range of 2000 to 3500mm**.
- Extreme low temperature and frost are not conducive to raise cashew plantations.
- The cultivation of this crop is being extended to non-traditional areas in the plains of **Karnataka, Madhya Pradesh, Chattisgarh** and some parts of North East hill region.

Council of Europe votes to recognize Holodomor as a genocide

Holodomor

- It is a **man-made famine** that occurred **in** the Soviet republic of Ukraine from **1932 to 1933**, peaking in the late spring of 1933.
- It left an estimated **3.9 million people dead**.
- The **primary victims** of the Holodomor (literally "death inflicted by starvation") **were rural farmers and villagers**, who made up roughly 80 percent of Ukraine's population in the 1930s.
- It was **part of a broader Soviet famine (1931–34)** that also **caused mass starvation in** the grain-growing regions of **Soviet Russia and Kazakhstan**.
- **In 2006, by the Law of Ukraine** "On the Holodomor of 1932-1933 in Ukraine", the **Holodomor was recognized as genocide** of the Ukrainian nation.
- **Causes:**
 - The origins of the famine lay in the **decision by** Soviet leader **Joseph Stalin to collectivize agriculture in 1929**.
 - Teams of Communist Party agitators **forced peasants to relinquish their land, personal property**, and sometimes housing to collective farms, and they **deported so-called kulaks—wealthier peasants**—as well as any peasants who resisted collectivization altogether.
 - Collectivization **led to a drop in production**, the disorganization of the rural economy^{**,**} and **food shortages**.
 - It also **sparked a series of peasant rebellions**, including armed uprisings, in some parts of Ukraine.
 - In 1932, the **Communist Party set impossibly high quotas** for the amount **of grain Ukrainian villages were required to contribute** to the Soviet state.
 - **When the villages were not able to meet** the quotas, authorities intensified the requisition campaign, **confiscating even the seed set aside for planting**.
 - **Farms, villages**, and whole towns in Ukraine **were placed on blacklists** and **prevented from receiving food**.
 - **Peasants were forbidden to leave** the Ukrainian republic **in search of food**.
 - In some cases, **soldiers were posted** in watchtowers **to prevent people from taking any of the harvest**. Millions starved as the **USSR**

sold crops from Ukraine abroad.

Army chief presents the president's colours to third battalion

President's Colours Award

- It is the **highest honor** that can be **awarded to any military unit, military training establishments, or state/UT Police Forces** of India.
- It is bestowed upon a military unit in **recognition of exceptional service rendered** to the nation, **both in peace and in war.**
- It is also **known as "Rashtrapati ka Nishaan" in Hindi.**
- **History:**
 - The tradition **began under colonial rule, but on November 23, 1950, the 'king's colour' of the erstwhile British Indian regiments was laid to rest** in Chetwode Hall, Dehradun, **to make way for the 'colours' of the President of the Republic of India.**
 - The **Indian Navy was the first** Indian Armed Force **to be awarded the President Colour** by Dr. Rajendra Prasad **on May 27, 1951.**
- **Award:**
 - It is a type of **special flag, also known as 'Nishaan', which is awarded to a military unit in an organised ceremony.**
 - The flag consists of a **golden border in the middle** and the **insignia of a respective military unit, training establishments, and police forces in the centre.**
 - Sometimes, **it may also contain the motto, important achievements, and battle participation of those military units** to which the award is bestowed.
 - **During any ceremonial parade, the President's Colour, i.e., the special flag of a military unit, is kept in a special position, and soldiers often march with the President's Colour on important dates, like their establishment anniversary.**

Saraswati Samman conferred on Tamil author Sivasankari

Saraswati Samman Award

- It is given annually for **outstanding literary works in 22 Indian languages** in the last 10 years.
- It is among the highest recognitions in the **field of Indian literature.**
- The selection follows a **rigorous three-tier process** leading up to a final decision by Chayan Parishad
- It was instituted by the **K. Birla Foundation. (the Vyas Samman and the Bihari Puraskar are other literary awards instituted by the foundation.)**

- It carries a citation, a plaque and **prize money of 15 lakh rupees.**

Other works of Sivasankari

- Sivasankari's literary career spans over five decades. She is the author of 36 novels, 48 novellas, 150 short stories, 15 travelogues, seven collections of essays, and three biographies.
- Her 2019 memoir, **Surya Vamsam, unfolds in two volumes** -- the first is the metamorphosis from a child to a young writer, and the second is the life and times of an acclaimed author spreading her wings.

How is GI-tagged Jaderi namakatti made in Tamil Nadu?

Jaderi namakatti

- These are **clay sticks** that are **white in colour**, usually available in finger-like shape with a smooth texture.
- Jaderi is a small village in Tiruvannamalai district of **Tamil Nadu**.
- There are around 120 families in Cheyyar taluk whose primary occupation has been **the making of namakatti for more than hundreds of years now.**
- Namakatti is made up of the **rich deposit of hydrous silicate minerals** that form fine grain particles of clay.
- The clay is processed and shaped in a finger like structure.
- The production of namakatti depends on the climatic condition as it needs a lot of sunlight to dry.
- It is used to adorn the foreheads of idols, men, and temple elephants as well as traditionally to treat stretch marks caused by childbirth.

Geographical Indication

- It is a sign used on products that have **a specific geographical origin and possess qualities** or a reputation that are due to that origin.
- This is typically used for **agricultural products, foodstuffs, wine and spirit drinks**, handicrafts and industrial products.
- The Geographical **Indications of Goods (Registration and Protection) Act, 1999** seeks to provide for the registration and better protection of geographical indications relating to goods in India.
- This GI tag is valid **for 10 years** following which it can be renewed.

Forest Department banks on native wisdom of Muthuvan tribe for Nilgiri Tahr conservation

Muthuvan tribe

- These people live in the border **hill forests** of **Kerala and Tamil Nadu**.
- They speak slightly different dialects and call each **other Malayalam Muthuvan and Pandi Muthuvan**.
- They are animists and spirit worshippers and **also worship the forest gods**.
- They believe that the spirits of their ancestors were the first migrants to the hill forests.
- They are known for **coexisting with wildlife** with their traditional knowledge.
- These tribal people follow a unique **system of governance** called **the 'Kani System'**.
- Under this system, each village is headed by a 'Kani', who is responsible for the **administration of the village**.
- They are experts in traditional medicines, which are extremely effective, and the medicine is kept confidentially and passed down through generations.
- **Occupation:** Agriculture is the main occupation of these Muthuvan tribes, producing quite a number of products like ragi, cardamom and lemon grass.

Project Tahr

- Under this project, the Tamil Nadu government plans to develop a **better understanding of the Nilgiri Tahr population** through surveys and radio telemetry studies
- **Reintroduce the Tahrs** to their historical habitat
- Address proximate threats.
- Increase public awareness of the species
- **Time period:** The project is to be **implemented for 5 year period from 2022 to 2027**.

Tripura High Court to Chakma organisations for boycotting Christian converts

Chakmas

- Chakmas are one of the largest **ethnic groups native to the Chittagong Hill Tracts (CHT) region of southeastern Bangladesh**.
- They have their own **age-old culture, language, and scripts**.
- They **primarily live** in the Chittagong Hills Tracts of **Bangladesh**, the Chin and Arakan provinces of **Myanmar**, in the **northeastern Indian states of Mizoram, Tripura, and Arunachal Pradesh**, and a few families in **West Bengal**.
- **Population:**
 - The Chakma population is estimated to be **around 550,000**.
 - The **majority** (approximately **300,000 people**) are located in the Chittagong Hill Tracts of **Bangladesh**.
 - There are also about **80,000 Chakmas in Mizoram State**.
- **Religion:**
 - The majority of Chakmas **practise Theravada Buddhism, tinged with aspects of animism and Hinduism**.

- **Every Chakma village has a Buddhist temple (kaang), and the Buddhist priests or monks are called Bhikhus.**
- The **Chakmas worship Hindu deities like Lakshmi**, who is worshipped as the Goddess of the Harvest.
- **Society:**
 - Chakmas are **divided into clans (gojas)**, which are further **subdivided into subclans (guttis)**.
 - **Members of the same subclan are forbidden to marry each other.**
- **Language:** The Chakmas speak a **dialect of Bengali (Bangla)** and **use the standard Bengali alphabet.**
- **Agricultural Practices:**
 - They practice **shifting cultivation called JUM.**
 - They **grow paddy, maize, cotton**, sesame, etc. in their JUM, along with vegetables and spices.
 - They **also know the art of low-land cultivation.**

Theravada Buddhism

- Theravada, the "**Doctrine of the Elders**," is the name for the school of Buddhism that **draws its scriptural inspiration from the Pali Canon, or Tipitaka**, which scholars generally accept as the **oldest record of the Buddha's teachings.**
- It is **one of the two major branches** of Buddhism, the **other being Mahayana Buddhism.**
- **Owing to its historical dominance in southern Asia** (Sri Lanka, Thailand, and Burma), Theravada is **also identified as "Southern Buddhism,"** in contrast to "Northern Buddhism," which migrated northwards from India into Tibet, China, Japan, and Korea.
- Theravada is **sometimes identified as "Hinayana" (the "Lesser Vehicle")**, in contradistinction to "Mahayana" (the "Greater Vehicle"), which is usually a synonym for Tibetan Buddhism.
- It is the **dominant religion in Cambodia, Laos, Myanmar, Sri Lanka, and Thailand** and is practiced by minorities in India, Bangladesh, China, Nepal, and Vietnam.
- In contrast to Mahayana and Vajrayana, Theravāda **tends to be conservative in matters of doctrine and monastic discipline.**
- **Beliefs:**
 - Theravada Buddhism places a **strong emphasis on individual spiritual striving and the pursuit of personal enlightenment** (nirvana).
 - **Monastic life**, meditation, and moral conduct **are central to this path.** The **monastic community as a whole is called the sangha.**
 - Like all Buddhist traditions, Theravada Buddhism **upholds the Four Noble Truths**, which outline the nature of suffering (dukkha), its causes, its cessation, and the path to its cessation, which is the Eightfold Path.
 - **Meditation is a central practice in Theravada Buddhism.** The

cultivation of mindfulness (sati) and insight meditation (vipassana) are key elements of the path to enlightenment.

- Theravada Buddhists **believe in the law of karma**, which means that one's actions have consequences.

Prime Minister extends best wishes on the auspicious occasion of KatiBihu to the people of Assam

Kati Bihu

- It is celebrated in the **state of Assam**.
- Kati means to cut and this day marks the **time of relocation of rice saplings**.
- It is also known as **Kongali Bihu**. (Kongali means poor)
- There are **another two Bihu festivals** celebrated in Assam - **Bhogali** or Magh Bihu is observed in January and **Rongali** or Bohag Bihu is observed in the month of April.
- **Significance**
 - During this month, there are not so many things to eat.
 - They celebrate this festival by lighting the earthen lamps or candles and lit their house with lighting.
 - **Lighting diya near Tulsi plant** is one of the main part of the festival. They worship Tulsi plant on this auspicious day.
 - People also light a special lamp **called "Akash Banti"** (Sky candle) in their paddy fields.
 - These lamps are fueled by mustard oil and are kept high on the tip of bamboo poles.
 - People believe that these **lighted lamps will guide their ancestors towards heaven**.

FACTS FOR PRELIMS

Mathematician Ruixiang Zhang to receive 2023 Sastra Ramanujan Prize

Sastra Ramanujan Prize

- The prize was instituted **in the year 2005**.
- It is **awarded every year** by the SASTRA University on its campus near Kumbakonam in Tamil Nadu, on Ramanujan's birth anniversary, December 22.
- The prize is **conferred annually to mathematicians from across the world who** is less than **32 years of age**, working in an area influenced by the Srinivasa Ramanujan.
- The age limit is 32 years to commemorate the fact that Ramanujan accomplished a phenomenal body of work in this short span.
- **Cash prize:** It carries a citation and an award of \$10,000.
- This award has gained global repute ever since it was instituted.
- **Other recipients:** Manjul Bhargava and Akshay Venkatesh

Ruixiang Zhang

- He is a young mathematician whose fundamental work spans from analytic number theory, combinatorics, and Euclidean Harmonic Analysis to geometry.**
- Building on his Princeton PhD thesis, Zhang in collaboration with Shaoming Guo proved a multivariable generalisation of the main conjecture in **Vinogradov's Mean Value Theorem**.
- This work, which has appeared in *Inventiones Mathematicae* in 2019, is considered a major achievement.

UK's beloved Sycamore Gap cut down

Sycamore tree

- It was located in a **dip between two hills**, at a **gap in the Hadrian Wall** – an old stone structure that is close to the border between England and Scotland – in Northumberland, northern England.
- The 'gaps' are essentially channels, which were "**naturally chipped away by** vast amounts of meltwater flowing beneath the ice sheets that once covered the area," thousands of years ago.
- **Features:**
 - This tree can **become extremely tall as they mature** – reaching a height of up to 35 metres.
 - They are commonly found in the UK and have leaves similar to that of a maple tree.
 - The **bark is dark pink-grey**, and smooth when young, but becomes

cracked and develops small plates with age.

- A sycamore can live for as long as 400 years.
- **Distribution:** It is **native to central, eastern and southern Europe**, it is believed to have been introduced to the UK by the Romans or in the Tudor era around the 1500s.

Hadrian Wall

- It is part of a larger UNESCO World Heritage Site called the 'Frontiers of the Roman Empire' and is found in the UK and Germany.

Sela Tunnel's 96% complete, may open by year-end

Sela Tunnel Project

- **Location:** It is located in the West **Kameng district of Arunachal Pradesh**.
- Once completed, the Sela tunnel will be **the world's longest bi-lane tunnel at an altitude above 13,000 feet**.
- It will ensure **all-weather connectivity between Guwahati in Assam and Tawang** in Arunachal Pradesh.
- It is being **excavated below the Sela Pass** on the NH-13 component of the **Trans-Arunachal Highway system**.
- It is being **built by the Border Roads Organisation (BRO)**under Project Vartak and the tunnel's construction commenced on April 1, 2019**.
- **Project Details:**
 - **Tunnel 1:** This **single-tube tunnel has a length of 980m**.
 - **Tunnel 2:** This **bi-lane tunnel has a length of 1555m**. It includes **one escape tube for emergencies**.
 - **Roads: Approach to Tunnel 1 is 7100m**, the road between the two tunnels is 1340m, and the **approach to Tunnel 2 is 340 m long**.

Sela Pass

- It is a **high-altitude mountain pass** located in the **Tawang district of Arunachal Pradesh**.
- **Elevation: 4,170 meters** above sea level
- It **connects Tawang Valley to the rest of India**.
- **Open throughout the year**, Sela Pass is **managed by the BRO**.

Swamp Deer population sees a rise at Manas Tiger Reserve

Swamp deer

- The swamp deer (**Rucervus duvaucelii**) also called as barasingha is a deer

species distributed in the Indian subcontinent.

- It belongs to **the family Cervidae** (order Artiodactyla), found in open forests and grasslands of India and Nepal.
- It eats predominantly wetland plants and herbaceous plants which are common in this deer's natural habitat.
- Its population is now restricted to isolated and scattered locations in Nepal, Assam and the northern areas of India.
- It is now extinct in both Bangladesh, and in Pakistan
- There **are three subspecies** of swamp deer found in the Indian Subcontinent.
 - The **western swamp deer** (*Rucervus duvaucelii*) found in Nepal,
 - **Southern swamp deer** (*Rucervus duvaucelii branderi*) found in central and north India and
 - **Eastern swamp deer** (*Rucervus duvaucelii ranjitsinhi*) found in the Kaziranga and Dudhwa National Parks.
- **Conservation status**
 - **IUCN Red List:** Vulnerable
 - **CITES:** Appendix I
 - The Wildlife Protection Act, 1972:**Schedule I

India kicking off Ichamati River dredging campaign

Ichamati River

- It is actually a **trans-boundary river** that flows through **India and Bangladesh.**
- It acts as a boundary between the two nations.
- It is now in **three parts**
 - The longer part flows from the **Mathabhanga River**, a distributary of the Padma, and after flowing for 208 km joins the **Kalindi River** near Hasnabad in North 24 Parganas and Debhata in Satkhira District.
- Ichhamati River and its tributaries **form a large oxbow lake complex** in North 24-Paraganas district near Bangaon.

National waterways in India

- To promote Inland Water Transport (IWT) in India**, 111 waterways (including 5 existing and 106 new)** have been declared as National Waterways (NWs) under the National Waterways Act, 2016.
- The Inland Waterways Authority of India (IWAI) primarily undertakes projects for development and maintenance of IWT infrastructure on national waterways through grant received from Ministry of Shipping.
- The head office of the authority is at **Noida.**

19 dolphins rescued alive from canals of Ganga-Ghagra basin, says study

Gangetic river dolphin

- It is a **freshwater species** and one of the few river dolphins found in the world.
- **Distribution:** It inhabits the **Ganges-Brahmaputra-Meghna** and **Karnaphuli-Sangu river** systems of Nepal, India, and Bangladesh.
- **Common Names:** Blind dolphin, Ganges dolphin, Ganges susu, hihu, side-swimming dolphin, South Asian River Dolphin
- It has been recognized as **India's National Aquatic Animal**.
- **Features:**
 - It has a long thin snout, rounded belly, stocky body and large flippers.
 - It feeds majorly on fishes and is usually found in counter-current systems of the main river channel.
 - Its eyes lack lens, and as a result, this species is also referred to as the "**blind dolphin**".
 - They have a **highly developed bio-sonar system** that facilitates them to hunt for fish even in murky waters.
 - Being a mammal, the Ganges River dolphin cannot breathe in the water and must surface every 30-120 seconds. Because of the sound it produces when breathing, the animal is popularly referred to as the 'Susu'.
- **Conservation status:**
 - **IUCN:** Endangered
 - **Wildlife (Protection) Act:** Schedule-I
 - **CITES:** Appendix I

Mundra Port Completes 25 Years

Mundra Port

- It is the **largest private port** and the **largest container port** in India.
- **Location:** It is located on the **north shores of the Gulf of Kutch**, near Mundra, **Kutch district, Gujarat**.
- It is a **deep-draft, all-weather port**.
- It is **also a special economic zone (SEZ)**.
- As much as **33 per cent of India's container traffic** flows through the port.
- **Ownership:** It is **run by Adani Ports and Special Economic Zone Limited (APSEZ)**, which is **India's largest commercial ports operator** and accounts for nearly one-fourth of the country's cargo movement.
- **Handling Capacity:**
 - With a **capacity of 260 MMT**, the port **handles over 155 MMT (FY 2022-23)**, which constitutes nearly **11% of India's maritime cargo**.
 - The port has **26 berths and two single-point moorings**, which allow

- it to accommodate a wide range of vessels.
 - The port handles a wide **variety of cargo, including containers, dry bulk, break bulk, liquid cargo**, and automobiles.
- It also has the **country's largest coal import terminal**, which facilitates faster cargo evacuation with minimal turnaround time.
- Mundra Port's rail is **connected to the national rail network**, and cargo can be handled for any location in India.

PMO gets into act in satellite spectrum row of Musk, Ambani

Satellite Spectrum

- The Satellite or orbit spectrum is a **segment of radio spectrum made available when satellites are placed into orbit**.
- This spectrum is **part of the broader radio frequency spectrum**, which encompasses all electromagnetic frequencies **used for various wireless communications** and broadcasting purposes.
- This spectrum is a **limited resource for every country, utilised by firms** to implement **satellite broadcasting, communication satellites**, and weather satellite services.
- This spectrum is **divided into many different frequency bands**. The **choice of bands depends on many factors**, including the specific applications.
- The **frequency is an integral part of the satellite's construction and doesn't change after launch**.
- **How does frequency impact the data transfer?**
 - In simple terms, **the frequency of a signal refers to the number of times the underlying wave oscillates per second**.
 - The **higher the frequency, the faster the waves** appear to move, and the **more data can be transmitted per second**.
 - However, **higher frequencies also mean shorter wavelengths** (that is, the length between the start and end of each wave), which can **lead to a reduction in the strength of the signal over a distance** (called signal attenuation) and an **increased risk of signal interference**.
- **Satellites generally transmit on a frequency between 1.5 and 51.5 gigahertz** (a gigahertz, or GHz, equals one billion hertz). High-speed broadband operates at the higher end of the spectrum.
- The **International Telecommunication Union, or ITU**, is the United Nations institution that **coordinates the allocation of frequencies globally**.
- The ITU has **allocated parts of this spectrum range to specific categories of services**, and has identified those frequencies **best suited for transmissions via satellite**.

International Telecommunication Union (ITU)

- It is the **United Nations specialized agency for information and communication technologies**.

- It is an **intergovernmental organization that coordinates** between governments and private sector bodies with respect to **global telecommunication and information communication technology (ICT) services**.
- It was **established in 1865 as International Telegraph Union**.
- In 1947 the ITU became a specialized agency of the United Nations.
- **Headquarters: Geneva, Switzerland.**
- **Membership:** It has a membership of **193 countries** and nearly **800 private sector entities** and academic institutions.
- **Functions:**
 - **allocate global radio spectrum and satellite orbits;**
 - coordination and **setting of technical standards** related to telecommunication/ICT;
 - strive to **improve access to ICTs** in underserved communities worldwide;
- **India and ITU:** India has been an active **member of the ITU since 1869** and has been a **regular member of the ITU Council since 1952**.

World's longest snake species found at IIT-Madras

Reticulated python

- It is a member of the **family Pythonidae**.
- These snakes come in a wide variety of color patterns, and many of the variations can be based on their location.
- It is a heavy-bodied, very long snake with a proportionately large head.
- Like most other python species, **it has heat-sensing pits**.
- The pits are deep and well-developed, located on the front upper and lower labials and the lower rear labials.
- This species, despite its striking color patterns, camouflages well within its environment.
- It's an example **of disruptive coloration, a type of camouflage** where the animal's pattern helps break up the outlines of its body. This pattern helps this giant snake disappear into the brush and allows it to ambush its prey.
- **Distribution:** This species has a broad range across southeastern Asia, including the Nicobar Islands, Myanmar, across to Indochina, Philippines, and Malaysia.
- **Habitat:** These tropical snakes are classically associated with lowland rainforests and wetlands.
- **Conservation status**
 - **IUCN:** Least concern

Sayeret Matkal, Israel's Tip Of The Spear, Preps For Hostage Rescue: Report

Sayeret Matkal Unit

- Sayeret Matkal, also **called General Staff Reconnaissance Unit 269**, is an **elite commando unit of the Israeli Defense Force (IDF)**.
- The unit was **established in 1957** at the initiative of its first commander, Avraham Arnan.
- It is **modelled on the UK's Special Air Service**, or SAS, a Special Forces unit of the British army, **taking the unit's motto "Who Dares Wins"**.
- Sayeret Matkal is a **field intelligence-gathering unit** that **conducts deep reconnaissance behind enemy lines** and is also tasked with **counter-terrorism** and **hostage rescue beyond Israel's borders**.
- It is **directly subordinate to the** Special Operations Branch of the **IDF's Directorate of Military Intelligence**.
- Israel only acknowledged its existence in the 1980s.
- They have been known to **work in conjunction with other elite Israeli units** such as Sayeret Tzanhanim, Flotilla 13, and Sayeret Golani.
- It is **best known for its role in the 1976 Entebbe airport raid in Uganda**, when its commandos **saved 100 Israelis from Palestinian hijackers**.