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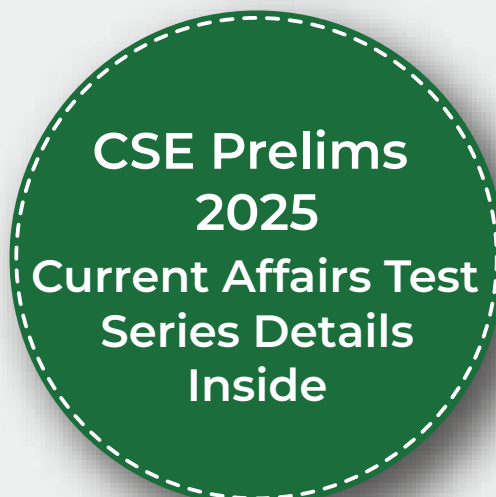
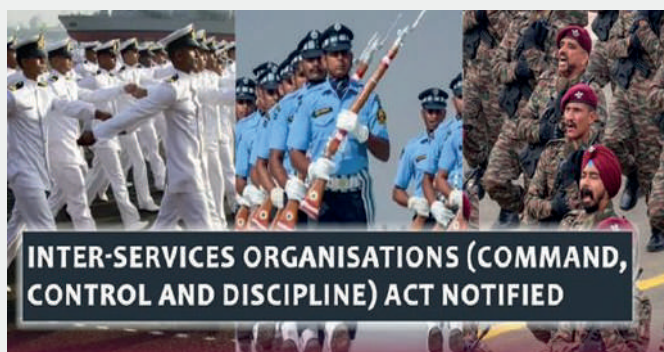
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PREFACE

Current Affairs UPSC CSE Prelims 2025

This high-quality monthly compilation of Current Affairs for Civil Services Exam Prelims 2025 is designed to help Civil Services Exam aspirants by:

1. **Saving preparation time:** Consolidates key current affairs from multiple sources for CSE Prelims.
2. **Reinforcing static concepts:** Links static concepts with current affairs
3. **Enhancing revision:** Combines important current affairs and static concepts for effective revision.

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- Aligns with the CSE prelims exam pattern.
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Details of our Current Affairs Test Series are on the back cover and inside this magazine.

Our team of content developers have worked rigorously to create this high-quality compilation, and we hope that all Civil Services and other competitive exam aspirants will make the best use of it. All the Best!

R. C. Reddy IAS Study Circle
Hyderabad



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POLITY

1. Eggshell skull rule

Context:

Underlining that the state and central consumer courts incorrectly applied the 'eggshell skull' legal principle, the Supreme Court restored the compensation of Rs 5 lakhs awarded by the district consumer forum in a medical negligence case.

About Eggshell skull rule:

- It is a common law principle applied in civil litigation.
- It states that all victims should be fully compensated for their losses, even in situations where the victim was more-susceptible to injury due to a predisposing condition or preexisting injury.
- This rule ensures that a defendant (the person being sued) cannot escape liability for exacerbating a pre-existing condition due to their negligence.
- The eggshell skull doctrine is named after a hypothetical situation where a person with a fragile skull, akin to an eggshell, suffers a head injury.
- If the victim's skull fractures more easily than the average person, the defendant is still fully liable for all resulting damages, despite the victim's unusual vulnerability.
- Despite its name, the eggshell skull rule applies to all types of injuries, including physical, emotional, and psychological harm.
- The rule is applied for claiming an enhanced compensation — for damage that is more than what could have been ordinarily anticipated to be caused by the defendant.

The eggshell skull rule has consequently also been referred to as the 'thin skull rule' in many of the cases

- **Origin:** The origins of the eggshell skull rule are most often traced back to an 1891 Vosburg v. Putney case in Wisconsin, US.

2. Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014

Context:

A decade has passed since the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act came into effect on May 1, 2014. About Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014:

- It was enacted in order to legalise the vending rights of street vendors (SVs).
- It aimed to protect and regulate street vending in cities, with State level rules and schemes, and execution by Urban Local Bodies (ULBs) through by-laws, planning, and regulation.
- The Act clearly delineates the roles and responsibilities of both vendors and various levels of government. It commits to accommodating all 'existing' vendors in vending zones and issuing vending certificates (VCs).
- The Act establishes a participatory governance structure through Town Vending Committees (TVCs).

Any person above 14 years of age, who is a street vendor has to register him/herself with the Town Vending Committee (TVC).

- The term "town vending committee" refers to a regulatory body under Section 22 of the act constituted by the appropriate government of the state. It can be one or more than one depending on the number of vending zones in the region.
- The TVC shall have a 40% representation from street vendors and another 10% from civil society. The remaining would be represented by local authorities, residential associations etc.
- These committees are tasked with ensuring the inclusion of all existing vendors in vending zones.
- Every vendor has to right relocate a new area for the practice of his street vending after consultation with the town vending committee.

- Where the vendor has been provided with the space on time basis the vendor will occupy the space within that time frame and vacate such space as the provided time frame ends.
- Additionally, the Act outlines mechanisms for addressing grievances and disputes, proposing the establishment of a Grievance Redressal Committee chaired by a civil judge or judicial magistrate.
- **It provides that the States/ULBs conduct a survey to identify SVs at least once every five years.**

3. Look Out Circulars

Context:

The Bombay High Court recently held that public sector banks (PSBs) cannot recommend or request the issuance of Look Out Circulars (LOCs) against loan defaulters.

About Look Out Circulars (LOCs):

- **A LOC is an instrument issued by the government as a directive to its immigration authorities to restrict and regulate the physical movement of a person.**
- The immigration department is tasked to stop any such individual against whom such a notice exists from leaving or entering the country. Law enforcement agencies often use LOCs as a coercive measure to stop any individual wanted or under suspicion by the police or an investigating agency from leaving or entering the country through designated land, air, and sea ports.
- LOCs are usually issued by the police, intelligence agencies, or other government agencies authorised by the Ministry of Home Affairs (MHA).
- **LOC does not have statutory backing in legislation, the power to issue LOCs and their regulation stems from the executive in the form of an Office Memorandum issued by the MHA in 2021,** which provides consolidated guidelines for opening LOCs against Indian citizens or foreigners.

Guidelines:

- **The guidelines categorically provide that LOCs can only be opened in criminal or penal cases, and the reason for the LOC must be indicated with the issue of the circular.**
- If there is no criminal or penal case pending, the LOC cannot be issued, and agencies can only request that they be informed of departure or arrival.

- **However, the guidelines provide that in exceptional cases, an LOC may be issued against an individual even when the case is not a criminal case.** This is in specified circumstances, such as when it is detrimental to the “**sovereignty, or security, or integrity of India**”, the “**bilateral relations with any State**”, or to the “**strategic and economic interests of India**”.
- LOCs are also permitted in cases where the individual is likely to engage in terrorism or offences against the State or when such departure would not be “in the larger public interest”.
- LOCs cannot be issued unless basic details — including name/parentage, passport number, and date of birth — are available, and such requests must be constantly monitored.
- It is the responsibility of the originator to constantly review the LOC requests and proactively provide additional parameters to minimise harassment to genuine passengers.
- It is also required that any LOC issued must be reviewed on a quarterly and annual basis by agencies that request such restrictions, and the result of the review must be informed to the MHA.
- MHA has categorically transferred the legal consequences of issuing an LOC to the originating agency, even though such OMs are issued by the Bureau of Immigration.
- **The power to issue such OMs and LOCs is sourced from The Passports Act, 1967, the key legislation for the grant of passports, travel documents, and “endorsements” to travellers at the time of emigration or immigration.**

4. Article 361 of the Constitution

Context:

Recently, a complaint alleging sexual harassment has been filed in Kolkata against West Bengal Governor C V Ananda Bose, Constitutional immunity bars the police from naming the Governor as an accused or even investigating the case.

- **Article 361 of the Constitution that deals with immunity to the President and the Governors states that they "shall not be answerable to any court for the exercise and performance of the powers and duties of his office or for any act done or purporting to be done by him in the exercise and performance of those powers and duties."**
- Article 361 has provisions which has two crucial sub-clauses: that no criminal proceedings whatsoever shall be initiated or continued against the President, or the Governor of a State, in any court during the term of his office.
- No process for the arrest or imprisonment of the President, or the Governor of a State, shall be issued from any court during his term of office.
- **No civil proceedings against the President or the Governor be instituted during his term of office in any court in respect of acts done by him in his personal capacity, whether before or after he entered upon his office, until the expiration of two months after notice has been delivered to him.**

Related Supreme Court Judgement

- Rameshwar Prasad v Union of India (2006): The Supreme Court outlined the immunity enjoyed by the Governor 'even on allegation of personal malafides', and held that 'the position in law is that the Governor enjoys complete immunity'.

Recent Interpretations

- The interpretation of Article 361 has been a subject of legal scrutiny.
- The Supreme Court of India has emphasised that the immunity provided under Article 361 is not absolute.
- The conduct of the President may be brought under review by any court, tribunal, or body appointed or designated by either House of Parliament for the investigation of a charge.

5. Voting is not a fundamental right

Context:

Amritpal Singh, the jailed head of the proKhalistan outfit Waris Punjab de, announced his intention to contest the Lok Sabha elections.

Why can accused persons in prison contest polls but not vote?

Background:

- In 1975, the Supreme Court in the case of Indira Gandhi v Raj Narain recognised that free and fair elections are a part of the 'basic structure' of the Constitution of India.
- However, the Supreme Court has held that the rights to elect and be elected do not enjoy the same status.
- **In 2006, in the case of Kuldip Nayar vs Union of India the supreme court held that the right to vote (or the right to elect) is "pure and simple, a statutory right".**
- **This means that voting is not a fundamental right and can be repealed.** Bar against contesting elections
- Section 8 of the Representation of People Act, 1951 (RP Act) is titled "Disqualification on conviction for certain offenses".
- If a person is convicted of any of the offenses in the exhaustive list provided in the provision, they will be disqualified from contesting elections to Parliament or state legislatures from the date of conviction onwards and face further a six-year disqualification from contesting in elections beginning from the date of their release.
- **This disqualification only kicks in once a person has been convicted and does not apply if they have only been charged with criminal offenses.**

Exceptions to disqualification

- **The Election Commission of India (ECI) is empowered under Section 11 of the RP Act to "remove" or "reduce" the period of disqualification.**
- **In 2019 the Supreme Court held that once a conviction is stayed "the disqualification which operates as a consequence of the conviction cannot take or remain in effect".**

Bar against the right to vote

- Section 62 of the RP Act provides a series of restrictions on the right to vote.
- **Its sub-clause (5) which states in broad terms "No person shall vote at any election if he is confined in a prison, whether under a sentence of imprisonment or transportation or otherwise, or is in the lawful custody of the police".**

Anukul Chandra Pradhan, Advocate,

Supreme Court v. Union of India, 1997 The Supreme Court in this case rejected a challenge to Section 62(5) on four grounds

that;

- The right to vote was a statutory right and could be subject to statutory limitations.
- There is a “resource crunch” as infrastructure would have to be provided and police would have to be deployed.
- A person in prison because of their conduct “cannot claim equal freedom of movement, speech and expression”.
- Restrictions on prisoners’ right to vote are reasonable as it is connected to keeping “persons with criminal background away from the election scene”.

6. Hindu Marriage Act, 1955

Context:

The Supreme Court recently said mere registration of marriage in absence of a proper ceremony would not be valid under the Hindu Marriage Act.

Hindu Marriage Act, 1955:

It codifies the law relating to marriage among Hindus.

- It not only provides for the ceremonies and registration for Hindu marriage but also lays down rules regarding Divorce.

Salient Features:

- A Hindu by birth or by conversion is the subject of the HMA Act.
- The definition of Hindu under the HMA Act includes Buddhist, Jain, and Sikh as well.

Marriageable age:

- The bridegroom must be at least 21 years old, and the bride must be at least 18 years old when they get married.
- Marriage among minors is punishable with imprisonment upto 3 years and/or fine upto Rs 1 lakh.

Registration:

- Registration of a Hindu marriage is subject to laws applicable in particular states.
- However, a marriage is not invalid or illegal due to lack of an official certificate.

Divorce:

- The Act also allows divorce through mutual consent.
- Although parties are legally not allowed to seek divorce within 1 year of marriage, they can go for judicial separation.
- However, divorce may be granted before completion of 1 year in special circumstances of exceptional hardship.
- It provides for the various grounds on the basis of which, divorce can be granted to one of the spouses if another does not agree to separate.
- There are special grounds which specifically allow the wife to seek divorce from her husband.

Forbidding bigamy:

- It also brought an end to the customary practice of bigamy, polygamy, or polyandry, i.e, multiple marriages.
- **Section 5 of the Act specifies that it is illegal to have two living wives at once, which is known as bigamy.**
- If one spouse is alive and the person remarries, such marriage is not only void, but the person is also punishable under Sections 494 and 495 of the Indian Penal Code, 1860.

Focus on mental stability:

- A marriage is considered null and void if anyone one or both the people get married being mentally unfit.
- In such cases, the couple must get legal consent before getting married.

Restitution of conjugal rights:

- Unlike any other matrimonial laws in India, the HMA Act also contains provisions for restitution of conjugal rights.
- So, if one of the spouses leaves the other without any reasonable excuse, the other spouse may reach the court to restore their matrimonial relations and bring back the spouse.

7. Status of Women in Indian Judiciary

Context:

The Supreme Court of India reserves seats for women in bar association committee. Status of Women in Indian Judiciary:

- A quick, back-of-the-envelope estimation shows there are only about three lakh women in the justice delivery system.
- If 35% of subordinate judges are women, the number comes down to 13% in the high courts.
- **Supreme Court - The 1st woman judge on the SC bench was Justice Fathima Beevi in 1989.**
- Today, there are only 3 women judges.
- **Until now, there has been no woman Chief Justice of India.**
- High courts – In over 7 decades there have been only 16 women chief justices.
- Out of the 650 High Court judges in India today, only 76 are women.
- **Justice Leila Seth was the 1st woman to be Chief Justice of a High Court (Delhi) in 1997.**

Women reservation in SC Bar Association:

- SCBA – Supreme Court Bar Association, is an Indian bar association which is an integral part of Supreme Court of India.
- It has been registered under the Societies Registration Act of 1860.
- It comprises of practising lawyers of the Supreme Court of India.
- It works for upholding, maintaining and consolidation of the constitutional values of democracy, rule of law and independence of Judiciary.
- **Requisite to change the rules – Needs two-third majority in SCBA general body.**
- Need of reservation for Women – It is only to guarantee a minimum and women members of the SCBA, subject to their eligibility, shall be entitled to contest the election for all the posts in the Executive Committee.
- **A bench of Justices Surya Kant and K V Viswanathan directed that Supreme Court to reserve seats for women SCBA.**
- **Reservation in Executive Committee - 33% of seats.**

- A minimum of 3 out of 9 positions in the Executive Committee and 2 of 6 Senior Executive Member posts.
- Reservation in Office-Bearer posts – At least one post of the Office Bearer shall be reserved for women candidates exclusively by turn and on rotation basis”.
- In the ensuing election for 2024-2025, the post of Treasurer of the Executive Committee is reserved for women.

8. Streedhan

Context:

Recently, the Supreme Court reiterated that stridhan is an “absolute property” of a woman, and while the husband has no control over the same.

About:

- Streedhan refers to gifts, money or property that a woman receives before her marriage, at the time of her marriage, during childbirth or widowhood, primarily from her parents, relatives or in-laws.
- Streedhan property does not become the joint property of the wife and the husband, and the husband has no title or independent dominion over the property as owner. The Supreme Court also held that streedhan is the absolute property of a woman, and she has all rights to dispose of it at her own pleasure.
- **If the marriage breaks down in the future, the woman has the right to recover the goods received as Stridhan. .**
- The Supreme Court held that the joint holding of a stridhan property by husband does not constitute any co-ownership. The Court further said that a woman can file a suit against her husband if he denies returning stridhan property under Section 14 of the Hindu Succession Act, 1956, as well as under Section 27 of the Hindu Marriage Act, 1955
- **Streedhan property in India is governed by the Hindu Succession Act. Section 14 of the Hindu Succession Act, 1956 has definitely been a safety guard for the women especially the Hindu women.**
- This section removes the disability of a female to acquire and hold property as an absolute owner and to convert any estate already held by a woman on the date of commencement of this act as a limited owner, into an absolute estate.

9. Blue corner Notice

Context:

Recently, the Central Bureau of Investigation (CBI) is likely to issue a Blue Corner notice against absconding Janata Dal (Secular) MP.

About:

- Blue corner Notice, referred to as an “enquiry notice,” enables police forces in member states to exchange crucial crime-related information, including verifying a person’s criminal record and location, among other details.
- B Series (Blue) Notices’ or “enquiry notices” which are issued “to have someone’s identity verified; to obtain particulars of a person’s criminal record; to locate someone who is missing or is an identified or unidentified international criminal or is wanted for a violation of ordinary criminal law and whose extradition may be requested.
- All Interpol’s notices are completely discretionary, i.e. Interpol itself cannot compel law enforcement authorities to act on a particular notice. Very often, actual action on the notices is predicated on the relations between the two countries.
- Blue notices are issued prior to or immediately after the filing of criminal charges, whereas red notices, which request the arrest of a fugitive, generally follow criminal convictions.
- The concerned individual can be stopped and arrested while travelling through a member state. There will also be other detrimental consequences such as the closure of bank accounts.

10. Look out circulars (LoCs) against wilful defaulters.

Context:

Recently, Bombay High Court recently quashed a provision of a central government office memorandum that enabled public sector banks to request issuance of look out circulars (LoCs) against wilful defaulters.

About:

According to the RBI, a wilful default is deemed to have occurred in any of the following four circumstances:

- When there is a default in repayment obligations by the unit (company/individual) to the lender, even when it has the capacity to honor the said obligations, there is a deliberate intention of not repaying the loan.
- The funds are not utilized for the specific purpose for which finance was availed but have been diverted for other purposes.
- When the funds have been siphoned off and not been utilized for the purpose for which it was availed. Further, no assets are available which justify the usage of funds.
- When the assets bought by the lenders’ funds have been sold off without the knowledge of the bank/lender.

There is a five-year restriction on granting credit facilities for the launch of new ventures by any lender to a wilful defaulter or any entity associated with a wilful defaulter, following their removal from the List of Wilful Defaulter.

- This prevents them from starting new businesses and taking on additional financial commitments.

SEBI prohibits a company from launching an Initial Public Offer (IPO) if such company or any of its promoters or directors is a wilful defaulter.

- SEBI also prohibits a listed company from issuing equity shares, convertible as well as nonconvertible securities, if any of its promoters or directors is classified as a wilful defaulter.

11. Misleading Advertisement

Context:

Social media influencers and celebrities are under scrutiny by the Supreme Court, which declared that they will bear equal responsibility for endorsing products or services in misleading advertisements.

About:

CCPA can impose penalty of up to 10 lakh rupees on manufacturers, advertisers and endorsers for any misleading advertisements.

For subsequent contraventions, CCPA may impose a penalty of up to 50 lakh rupees. **The Authority can prohibit the endorser of a misleading advertisement from making any endorsement for up to 1 year and for subsequent contravention, prohibition can extend up to 3 years.**

Under Section 4 of the Drugs & Other Magical Remedies Act, publishing misleading advertisements regarding drugs is prohibited, punishable by imprisonment or fines.

It states that no person shall take any part in the publication of any advertisement relating to a drug if the advertisement contains any matters which—

- directly or indirectly gives a false impression regarding the true character of the drug; or
- makes a false claim for the drug; or
- is otherwise false or misleading in any material particular

The Cable Television Networks (Regulation) Act, 1995 (CTN Act) act regulates the operation of cable television networks in India.

- **It prohibits the transmission of advertisements that are indecent, offensive, or harmful to viewers' interests.**

12. Inter-Services Organisations Act**Context:**

The union government have recently notified the Inter-Services Organisations Act through gazette notification.

Inter-Services Organisations Act:

The Act empowers Commanders-in-Chief and Officers-in-Command of ISOs to exercise control over Service personnel, serving under them.

- It will be effective for maintenance of discipline and administration, without disturbing the unique service conditions of each individual Service.

- **The Act will empower the Heads of ISOs and pave the way for expeditious disposal of cases, avoid multiple proceedings.**
- It will be a step towards greater integration and joint-ness among the armed forces personnel.
- It is essentially an 'enabling Act' and does not propose any change in the existing Service Acts/Rules/Regulations which are time-tested and have withstood judicial scrutiny over the last six decades or more.
- The top priority for the CDS is the proposed reorganisation of the armed forces into integrated theatre commands.
- It was passed by both the Houses of Parliament during the Monsoon Session of 2023 and received the assent of the President on August 15, 2023.

12. Inter-Services Organisations (ISOs) (Command, Control, and Discipline) Act**Context:**

Recently, the Union Government has notified the Inter-Services Organisations (ISOs) (Command, Control, and Discipline) Act through a Gazette notification. Key Provisions of the Act:

- The Act seeks to empower the central government to set up an interservices organization by notification.
- This can include a joint services command — comprising units and personnel drawn from the threearmed forces and persons of other forces attached to such a body. The commander-in-chief or the officer-incommand will be the head.
- The Act empowers the Commander-in-Chief/ Officer-in-Command of an Inter-services Organisation to exercise command and control over the personnel serving in or attached to it.
- **The superintendence of an Interservices Organisation will be vested in the central government.**
- The government may also issue directions to such organizations on grounds of national security, general administration, or public interest.
- **The Act is essentially an Enabling Act and it does not propose any change in the existing Service Acts/Rules/Regulations.**

- Service personnel when serving in or attached to an Inter-Services Organisation will continue to be governed by their respective Service Acts.
- **The Act empowers the Commander-in-Chief/ Officer-in-Command of an Inter-services Organisation to exercise command and control over the personnel serving in or attached to it.**
- The Commanding Officer will be empowered to initiate all disciplinary or administrative actions over the personnel appointed, deputed, posted, or attached to that Interservices Organisation.

13. Internet Shutdowns in India

Context:

India witnessed the highest number of Internet shutdowns in the world in 2023, a record it has held for the sixth straight year, according to a report. Anuradha Bhasin v. Union of India Case:

- In 2020 the Supreme Court by ruling on Jammu and Kashmir Internet shutdown held that indefinite internet shutdowns by the State is not permissible under Indian Constitution.
- The apex Court further stated that imposition of Section 144 cannot be used as a mechanism to avoid genuine protest which is permitted under the Constitution.
- Section 144 has very specific parameters, only if those parameters are satisfied then only a Magistrate can pass the orders.

Key Highlights of the orders:

- **Usage of the Internet is the Fundamental Right under Article 19 of the Indian Constitution.**
- Internet shutdowns can be of temporary period but not for indefinite period.
- Government to publish all orders imposing restrictions under Section 144.
- The Court had also said that any order with regard to Internet Shutdowns will come under Judicial Scrutiny.

Legal Provisions Relating to Internet Shutdown:

Grounds: Indian States and Union Territories can impose an internet shutdown only in case of a "public emergency" or in the interest of "public safety", according to the Indian Telegraph Act.

- However, the law does not define what qualifies as an emergency or safety issue.

Till the year 2017, shutdowns were imposed largely under Section 144 of the Code of Criminal Procedure (CrPC).

- Section 144 of CrPC gave the police and the District Magistrate the powers in order to prevent unlawful gathering of people and also to direct any person to abstain from a certain activity.

However, in 2017 the law was amended and the Government promulgated the Temporary Suspension of Telecom Services (Public Emergency or Public Safety) Rule 2017.

14. Foreigners Tribunal

Context:

The Supreme Court (SC) recently halted the deportation of a woman who was declared a foreigner by a Foreigners' Tribunal in Assam.

About Foreigners Tribunal (FT):

- **The FTs came into existence through the Foreigners (Tribunals) Order, 1964, in order to let state administration (District collector/District Magistrate) to make reference about a person suspected to be a foreigner to the Tribunals.**
- The Foreigners (Tribunals) Order, 1964, was enacted by the Central government through the use of powers granted under Section 3 of the Foreigners Act, 1946.
- **The Foreigners (Tribunals) Order, 1964, applies to the whole of India, yet, FTs exist only in Assam as of now.**
- In other states, if an illegal immigrant is found, he is produced before a local court and dealt with as per the Foreigners Act, 1946.
- **Prior to the 2019 amendment to the Foreigners (Tribunals) Order, 1964, only the Centre was empowered to establish FTs in states, but after this amendment, the power has been granted to states as well.**

Need for FT:

- The superintendents of police (SPs) and district commissioners were empowered to detect suspected foreigners. References for these “suspected persons” were required to be made before an authority which came into existence through the Foreigners (Tribunals) Order, 1964.
- The Election Commission of India (ECI) can also refer cases of D or Doubtful voters to the local SP, who then refers them to a tribunal to verify their citizenship.
- The persons excluded from the final draft of the National Register of Citizens (NRC) as released in August 2019 can appeal before the FTs to prove their citizenship.

What is FT supposed to do after receiving a reference against a person?

The Tribunal is supposed to serve upon such person a copy of the main grounds on which he is alleged to be a foreigner, as well as a show cause notice, within 10 days of receipt of reference from the concerned authority.

- The notice should clearly indicate that the burden is on the proceeded to prove that he or she is not a foreigner.
- The FT is to give the person a reasonable opportunity to make a representation (in person or through a lawyer) and produce evidence in support of his case.
- If the proceeded fails to produce any proof in support of his claim of citizenship and also not able to arrange for bail, the FT shall detain him and send him to a detention centre.

The Supreme Court (SC) held that the decision of the FTs regarding the nationality of a person will be binding. Also, the decision of the tribunal will be given more importance than that of the Government or credentials and the NRC verification authority.



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15. Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989**Context:**

The Allahabad High Court recently said that an alleged act of intentional insult or intimidation causing humiliation would constitute an offence under the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989 only if it is committed in public view.

About Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Act, 1989:

- It is an Act to prevent the commission of offences of atrocities against the members of the Scheduled Castes (SCs) and the Scheduled Tribes (STs) by persons other than SCs and STs.
- It provides for punishment for offences of atrocities committed against SCs and STs.
- **It authorizes the Central Government to frame rules for carrying out the purpose of the Act.**
- The Act is implemented by the respective State Governments and Union Territory Administrations, which are provided due central assistance under the Centrally Sponsored Scheme for effective implementation of the provisions of the Act.

Offences:

- **This Act does not apply to crimes committed between SCs and STs or between STs and SCs.**
- There are 37 offences included in the Act that involve patterns of behaviour inflicting criminal offences and breaking the self-respect and esteem of the SCs and STs community.
- Among these are the denial of economic, democratic, and social rights, as well as the exploitation and abuse of the legal system.

Investigation:

- **All offences listed in the Act are cognizable.**
- **An investigation of offence committed under the Act cannot be investigated by an officer not below the rank of Deputy Superintendent of Police (DSP).**
- The investigation should be completed within 30 days, and the report should be sent directly to the director of the state police.

Special Courts:

- The act clearly states about the constitution of special courts for hearing cases on atrocities against SCs and STs.
- For the purpose of providing for a speedy trial, the State Government shall with the concurrence of the Chief Justice of the High Court, establish in each district a Court of Session to be a Special Court exclusively to try the offences under this Act.
- The exclusive Special Courts shall try offences under this Act on day-to-day basis.
- For every Special Court, the State

Government shall specify a Public Prosecutor or appoint an advocate who has been in practice as an advocate for not less than seven years, as a Special Public Prosecutor for the purpose of conducting cases in that Court.

Punishment:

- The minimum punishment in most cases is six months of imprisonment, while the maximum is five years sentence and with fine.
- In some cases, the minimum is enhanced to one year while the maximum goes up to life imprisonment or even a death sentence.
- Section 4 of the act deals with punishment for neglect of duties by a public servant. According to this section if a public servant, who is not a member of the SC or ST, deliberately neglects his duties, which he should perform under the Act, he is liable for punishment with imprisonment up to six months.
- According to the Scheduled Castes and Scheduled Tribes (Prevention of Atrocities) Rules, 1995, the District Magistrate or the Sub-Divisional Magistrate, or any other Executive Magistrate shall make arrangements for providing immediate relief in cash or in kind, or both, to the victims of atrocity, their family members, and dependents.
- Such immediate relief shall also include food, water, clothing, shelter, medical aid, transport facilities, and other essential items necessary for human beings.

16. Form 17C**Context:**

No legal mandate to give Form 17C to anyone other than the polling agent, EC submits to SC.

More on news:

In response to a plea for uploading polling station-wise voter turnout data on its website at the close of poll, the Election Commission has told the Supreme Court that it cannot upload the Form 17C, which is the record of votes polled at a polling station, as there is no legal mandate to give it to anyone other than candidates and their agents.

Key Components of Form 17C:**Part I - Account of Votes Recorded:**

- This section includes details about the number of EVMs used, the number of votes polled in each machine, and any discrepancies noted during the counting process.

Part II - Result of Counting:

This section records the votes received by each candidate, including those from postal ballots. It provides the final tally of votes for each candidate, which is then used to determine the election result.

Authentication:

- The form must be signed by the Returning Officer and the candidates or their agents, ensuring that all parties acknowledge and agree with the recorded results.

17. Joint Parliamentary Committee**Context:**

India's main opposition party has called for setting up a Joint Parliamentary Committee (JPC) to investigate claims that the Adani Group sold low-grade coal to a state-run company in Tamil Nadu, pretending it was of higher quality.

Joint Parliamentary Committee (JPC):

- **The JPC is an ad-hoc Committee, established by the Parliament to conduct a thorough examination of a specific subject or Bill.**
- It consists of members from both Houses as well as from the ruling and opposition parties and is chaired by a member of the Lok Sabha (appointed by Speaker of the Lok Sabha).

Some of the cases in which JPC were formed include:

- Bofors scandal (1987)
- Harshad Mehta Stock market scam (1992)
- Ketan Parekh share market scam (2001)
- National Register of Citizens (NRC, 2016)
- Personal Data Protection Bill (2019)

The Parliament determines the composition of the JPC, and there is no set limit on the number of members.

- The committee is dissolved after completing its term or task.
- The JPC has the authority to gather evidence from experts, public bodies, associations, individuals, or interested parties either on its own initiative or in response to their requests.
- The committee's recommendations are advisory and not mandatory for the government to follow.
- However, suggestions by the Select Committees and JPCs — which have a majority of MPs and heads from the ruling party — are accepted more frequently.

18. Article 329(b) of Constitution**Context:**

The Election Commission (EC) recently invoked Article 329(b) of the Constitution, which prohibits judicial intervention in the working of the commission in the middle of the election process.

About Article 329(b):

- Enshrined in Part XV of the Constitution, articles 324-329 specifically discuss elections.
- While Article 324 gives the poll panel powers to direct and control elections, Article 329, which has two clauses, concerns itself with the role of the judiciary in electoral matters.
- **Article 329(a) says the "judiciary is not allowed to challenge the constitutionality of laws relating to the boundaries of electoral districts or the allocation of seats.**
- **Article 329(b) as amended by the Constitution (19th Amendment) Act, 1966, provides that notwithstanding anything in the Constitution, no election to either House of Parliament or the Legislature of a State shall be called into question except by an election petition presented to such authority and in such manner as may be provided for by or under any law made by the appropriate Legislature.**
- It stipulates that election-related inquiries are exclusively addressed through election petitions presented to the authority designated by that law.
- The Representation of the People Act, 1951, furthers this clause as it empowers the high courts to hear and decide election petitions.
- A decision in such petitions can be challenged in the Supreme Court (SC).

SC Rulings:

- **In the 1952 Ponnuswamy judgment (Ponnuswami v. Returning Officer Namakkal),** the SC held that the word "election" in Article 329(b) connotes the entire electoral process commencing with the issue of the notification calling the election and culminating in the declaration of result, and that the electoral process once started could not be interfered with at any intermediary stage by courts.
- **The SC in K. Venkatachalam vs. A. Swamickan (1999) determined that Article 329(b) is inapplicable if the matter pertains to Articles 191 and 193,** which deal with disqualifications and penalties related to parliamentary and legislative assembly membership, respectively.



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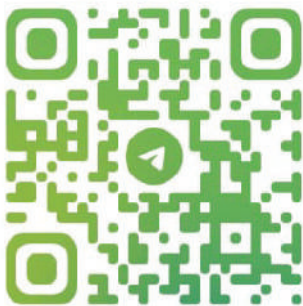
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ECONOMY

1. Front Running

Context:

The Securities and Exchange Board of India has approved amendments to its mutual fund regulations to curb frontrunning. About Front Running:

- Front-running refers to trading in a stock or any other financial asset while having insider knowledge of a future transaction.
- This can be done by a broker who knows about a client's upcoming order, or by an investor who is aware of a forthcoming recommendation from their firm.
- This practice is unethical as by buying or selling before the large trade, they can influence the price of the security, potentially harming other investors.

2. Drip Pricing

Context:

The Centre recently warned about "drip pricing", saying it can surprise consumers with "hidden charges".

About Drip Pricing:

- Drip pricing is a pricing technique in which firms advertise only part of a product's price and reveal other charges later as the customer goes through the buying process.
- Drip pricing may initially withhold unavoidable fees, such as booking, service, resort, or credit card fees, local hotel taxes, or any other add-ons like internet access or certain facilities and amenities that are required to use a product or service.
- These additional and often mandatory costs are then disclosed by the seller one by one or "dripped" to the buyer at the point of purchase.
- It is commonly used in the hospitality and travel markets, as well as for other online payments.
- Companies may utilize a price dipping approach in order to entice a customer into starting the purchase process, at which point the customer may not want to restart his or her search, once they find out the added costs.

- It can be frustrating for consumers, who typically want to know upfront how much a product or service will cost, and may feel duped by later additions.
- Drip pricing can make comparison shopping more difficult and penalize sellers who are more transparent with their pricing.
- An example of price dipping is the cost of an airplane ticket that doesn't include baggage fees.

3. Participatory notes

Context:

Investments through participatory notes in the Indian capital markets reached Rs 1.5 lakh crore at the end of February, making it the highest-level in nearly six years.

About

- Participatory notes (P-notes) are issued by registered foreign portfolio investors (FPIs) to overseas investors who wish to be part of the Indian stock market without registering themselves directly.
- Participatory notes were introduced in India in 2000 by the Securities and Exchange Board of India (SEBI) to allow foreign investors (financial institutions and high-net-worth individuals) access to the Indian financial markets.

Advantages of participatory notes:

- **Anonymity:** Any entity investing in participatory notes is not required to register with SEBI, whereas all FPIs have to compulsorily get registered. It enables large hedge funds to carry out their operations without disclosing their identity.
- **Ease of trading:** Trading through participatory notes is easy because they are like contract notes transferable by endorsement and delivery.
- **Tax saving:** Some of the entities route their investment through participatory notes to take advantage of the tax laws of certain preferred countries.

Disadvantages of P-notes: However, because of the anonymity, Indian regulators face difficulty determining a participatory note's original owner and end owner.

- Therefore, substantial amounts of unaccounted-for money enter the country through participatory notes. This flow of untracked funds has raised some red flags.

4. Central Drugs Standard Control Organisation

Context:

The Central Drugs Standard Control Organisation (CDSCO) has become the sole authority for issuing manufacturing licences for new drugs meant for exports, withdrawing the power from state governments amid heightened global scrutiny of Indian made drugs About Central Drugs Standard Control Organisation (CDSCO):

- It is the National Regulatory Authority (NRA) of India for the medical devices industry under the provisions of the Drugs and Cosmetics Act.
- It is responsible for overseeing the import, manufacture, sale, and distribution of medical device in the country. The CDSCO ensures that medical devices comply with safety, quality, and efficacy standards.
- It works under the Directorate General of Health Services, Ministry of Health & Family Welfare, Government of India.
- The Drugs Controller General of India (DCGI) is the head of the CDSCO.
- Headquarters: New Delhi.

Under the Drugs and Cosmetics Act,

CDSCO is responsible for,

- Approval of new drugs;
- Conduct of clinical trials;
- Laying down the standards for drugs;
- Control over the quality of imported drugs in the country;
- Coordination of the activities of State Drug Control Organizations;

CDSCO, along with state regulators, is jointly responsible for the grant of licenses for certain specialized categories of critical Drugs such as blood and blood products, I. V. Fluids, Vaccine, and Sera.

The CDSCO conducts inspections and audits to ensure that medical device companies are complying with regulations related to safety, quality, and efficacy.

5. Market Economy

Context:

Vietnam has been pushing the President of the United States of America to quickly change its “non-market economy” classification to “market economy” status.

About Non-market Economy Status: The United States of America designates a country as non-market economy based on several factors namely:

- If the country's currency is convertible;
- If wage rates are determined by free bargaining between labour and management;
- If joint ventures or other foreign investment are allowed; whether the means of production are owned by the state; and
- If the state controls the allocation of resources and price and output decisions. Other factors like human rights are also considered.

The non-market economy label allows the US to impose “anti-dumping” duties on goods imported from designated countries.

What is market Economy?

- It is a system in which production decisions and the prices of goods and services are guided primarily by the interactions of consumers and businesses.
- That is, the law of supply and demand, not a central government's policy, is allowed to determine what is available and at what price.
- A market economy gives entrepreneurs the freedom to pursue profits by creating new products, and the freedom to fail if they misread the market.

Key facts about anti-dumping duty:

- It is a tariff imposed on imports manufactured in foreign countries that are priced below the fair market value of similar goods in the domestic market.
- The government imposes antidumping duty on foreign imports when it believes that the goods are being “dumped” – through low pricing – in the domestic market.

- Anti-dumping duty is imposed to protect local businesses and markets from unfair competition by foreign imports.

6. Volatility Index

Context:

India VIX, which is an indicator of the market's expectation of volatility over the near term, surged past the 21 mark.

What is the Volatility Index?

- The Volatility Index, VIX or the Fear Index, is a measure of the market's expectation of volatility over the near term.
- Volatility is described as the 'rate and magnitude of changes in prices' and in finance often referred to as risk.
- During periods of market volatility, the market moves steeply up or down and the volatility index tends to rise. As volatility subsides, the Volatility Index declines.
- The Chicago Board of Options Exchange (CBOE) was the first to introduce the volatility index for the US markets in 1993 based on S&P 100 Index option prices.
- In 2003, the methodology was revised and the new volatility index was based on S&P 500 Index options.

What is India VIX?

India VIX is a volatility index computed by the NSE based on the order book of NIFTY Options.

- India VIX indicates the investor's perception of the market's volatility in the near term i.e. it depicts the expected market volatility over the next 30 calendar days.
- The higher the India VIX values, the higher the expected volatility and vice versa, as per NSE.

7. Wholesale Price Index (WPI)

Context:

Inflation in India's wholesale prices rose to a 13-month high of 1.26% in April, owing to an uptick in food inflation and a 1.4% year-on-year rise in fuel and power prices after several months of deflation. **About Wholesale Price Index (WPI):**

- WPI measures the changes in the prices of goods sold and traded in bulk by wholesale businesses to other businesses.
- It is calculated and published by the Office of Economic Advisor, Department of Industrial Policy and Promotion in the Ministry of Commerce and Industry.
- WPI data is published monthly, with the index value representing an estimate of the price level for the month as a whole, rather than a specific date.
- Analysts use the numbers to track the supply and demand dynamics in industry, manufacturing, and construction.
- An upward surge in the WPI indicates inflationary pressure in the economy, and vice versa.
- The quantum of rise in the WPI month-after-month is used to measure the level of wholesale inflation in the economy.

Difference between WPI and Consumer Price Inflation (CPI) inflation:

- While the WPI keeps track of the wholesale price of goods, the CPI measures the average price that households pay for a basket of different goods and services.
- WPI is restricted to only goods, while CPI is for both goods and services.
- Even as the WPI is used as a key measure of inflation in some economies, the Reserve Bank of India (RBI) no longer uses it for policy purposes, including setting repo rates. The RBI currently uses CPI, or retail inflation, as a key measure of inflation to set monetary and credit policy.
- New series of WPI: With an aim to align the index with the base year of other important economic indicators such as GDP and IIP, the base year was updated to 2011-12 from 2004-05 for the new series of WPI, effective from April 2017.

How do you calculate WPI?

- It is calculated by taking a weighted average of the prices of a basket of goods, with each item's weight determined by its share of total wholesale sales.

The basket of goods comprises three major groups:

- Primary Articles (Weight 22.62%)
- Fuel and Power (Weight 13.15%)
- Manufactured Products (Weight 64.23%)

The prices of a total of 697 items are tracked under the 2011-12 series of the WPI, which includes 117 primary items, 16 items of fuel and power, and 564 manufactured products.

8. Labour Market Impact Assessment (LMIA)

Context:

In recent times, many Indians are turning to LMIA work permits to immigrate to Canada.

- A Labour Market Impact Assessment (LMIA) is a document that an employer in Canada may need to get before hiring a foreign worker.
- A positive LMIA will show that there is a need for a foreign worker to fill the job and it does not guarantee permanent residency.
- It will also show that no Canadian worker or permanent resident is available to do the job.
- A positive LMIA is sometimes called a confirmation letter.
- If the employer needs an LMIA, they must apply for one and once an employer gets the LMIA, the worker can apply for a work permit.
- Several factors are responsible for the popularity of LMIA in India that include:
- Increasingly competitive nature of the international student visa process, due to caps on international admissions and
- The labour shortages in sectors such as farm/dairy workers, cooks, welders, plumbers, carpenters, and caregivers.

9. National Savings Certificate (NSC)

Context:

The Prime Minister recently declared Rs 9.12 lakh investment in the National Savings Certificate (NSC) scheme in his nomination filing.

About National Savings Certificate (NSC):

- It is a fixed-income investment scheme launched by the government of India.
- It aims at encouraging users, who are primarily low- to mid-income investors, to invest as well as save taxes.

- You can invest in NSC from the nearest post office in your name, for a minor or with another adult as a joint account.

Features:

- **Interest Rates:** The certificates earn an annual fixed interest, which is revised every quarter by the government, thus guaranteeing a regular income for the investor.
- **Maturity Period:** Five years.
- The amount of NSCs that can be purchased has no upper limit.
- **Tax Saver:** As a government-backed tax-saving scheme, the principal invested in NSC qualifies for tax savings under Section 80C of the Income Tax Act up to Rs. 1.5 lakhs annually.
- **Accessible:** It can be easily bought from any post office on submission of the required KYC documents. Also, it is easy to transfer the certificate from one PO to another, as well as from one person to another, without impacting the interest accrual/maturity of the original certificate.
- **Loan Collaterals:** NSC certificates are accepted as collateral or security for secured loans in Banks and NBFCs.
- **Nomination:** The investor can nominate any family member (even a minor) so that they can inherit it in the unfortunate event of the investor's demise.
- **Premature Withdrawal:** Generally, one cannot exit the scheme early except on the death of an investor, on a court order, or on forfeiture by a pledgee who is a Gazetted Government Officer for it.

Eligibility Criteria for NSC:

- **Hindu Undivided Families (HUFs), Trusts, and Private and public limited companies are not eligible to invest in NSC.**
- **The individual must be a resident Indian citizen. Non-resident Indians (NRIs) are not eligible to invest in NSC.**
- There is no age limit for individuals to purchase an NSC.

10. Bond Buyback

Context:

The Reserve Bank of India (RBI) has responded to tight liquidity conditions in the banking system by announcing a significant reduction in the government's treasury bill sales and introducing a new selection of bonds for the Centre's buyback operations. About Bond Buyback:

- It is a process whereby the central government and state governments buy back their existing securities, by redeeming them prematurely, from the holders.
- Bond buybacks are liability management tools widely used in government securities markets to manage refinancing and liquidity risks.
- It enables issuers to retire an outstanding debt before its maturity date against a cash payment.

The objectives of buyback can be:

- Reduction of cost (by buying back high coupon securities),
- Reduction in the number of outstanding securities and improving liquidity in the G-Secs market (by buying back illiquid securities) and ☐ Infusion of liquidity in the system.

What is a Bond?

- It is a debt instrument in which an investor loans money to an entity (typically corporate or government) which borrows the funds for a defined period of time at a variable or fixed interest rate.
- Bonds are used by companies, municipalities, states and sovereign governments to raise money to finance a variety of projects and activities. Owners of bonds are debt holders, or creditors, of the issuer.

11. Generalized System of Preferences (GSP)

Context:

It is accepted wisdom that GSP renewal would offer an avenue for wide-ranging U.S.-India trade negotiations that can help in vaulting the bilateral trade relationship.

About Generalized System of Preferences (GSP):

- It was instituted in 1971 under the aegis of the United Nations Conference on Trade and Development (UNCTAD).

- It is a voluntary trade measure implemented by developed countries that provides an advantageous, or "preferential", tariff treatment to imports from developing countries.
- The preferences are in the form of either elimination or reduction in customs duty when the list of eligible products from the beneficiary developing country (BDC) is exported to the developed country. ☐ However, an exporter under the GSP is required to fulfil the rules of origin under the GSP scheme. The rules of origin are the criteria required to ensure that the product exported originates from the country of export and is not being diverted from another country.
- The GSP is a unilateral customs duty preference scheme i.e. there is no need for India or other BDCs to provide reciprocal customs duty preferences for the developed country.
- The major countries who grant GSP preferences to developing countries are Armenia, Australia, Azerbaijan, Belarus, Canada, European Union (EU), Japan, Kazakhstan, Kyrgyz Republic, New Zealand, Norway, Russian Federation, Switzerland, Tajikistan, Turkmenistan, Turkey, United Kingdom (UK), United States (US), and Uzbekistan.
- Each of these developed countries has its own regulatory frame work under which it provides the GSP tariff preferences.
- The GSP provided also varies in terms of the products on which preferences are provided and the developing countries exports to which the tariff preferences are granted.

In terms of trade volumes, the GSPs granted by the EU and the US are the most comprehensive and, hence, the most important for developing countries.

- Some of the GSP schemes also provide additional tariff preferences to a specified class of developing countries, with most providing the largest coverage of GSP customs duty preferences to exports from Least Developed Countries (LDCs).

India is one of the primary beneficiaries in terms of export volume realized under the GSP. Around 40% of India's exports to the EU are under the EU GSP, while prior to the USGSP withdrawal, around 10% of India's total exports to the US were under the GSP.

12. Travel & Tourism Development Index

Context:

India has improved its ranking in the recently released Travel & Tourism Development Index as compared to the previous report.

About Travel & Tourism Development Index:

- It is the second edition of an index that evolved from the series, a flagship index of the World Economic Forum that has been in production since 2007.
- It is created in collaboration with the University of Surrey and with input from leading Travel & Tourism (T&T) stakeholder organizations, thought leaders and data partners.
- It measures the set of factors and policies that enable the sustainable and resilient development of T&T.
- India is ranked 39th, the highest in South Asia and among other lowermiddle-income economies.

India's new ranking is a notable improvement from its 54th position in the 2021 index. On an overall index score of 7, where 1 is the worst, and 7 the best, India scored 4.25.

India's significant leap in the rankings underscores its growing competitiveness in the global tourism landscape.

- The biennial index analysed the travel and tourism sectors of 119 countries, evaluating them on a range of factors and policies that foster tourism development.

13. Economic Capital Framework

Context:

The Reserve Bank of India (RBI) has approved the transfer of Rs 2.11 lakh crores as surplus to the Union government for the FY-2023-24, based on the Economic Capital Framework (ECF).

Economic Capital Framework (ECF)

- The Economic Capital Framework (ECF) adopted by the RBI in 2019 as per recommendations of the Bimal Jalan committee.
- The economic capital framework provides a methodology for determining the appropriate level of risk provisions and profit distribution to be made under Section 47 of the RBI Act, 1934.

- As per this provision, the central bank is required to pay the balance of its profits to the central government after making provision for bad and doubtful debts, depreciation in assets, and contributions to staff.

More about news:

- The announcement came along with an increase in the Contingent Risk Buffer (CRB) to 6.50 percent for fiscal year 2023-24.
- The Board decided to increase the Contingent Risk Buffer (CRB) to 6.50% for 2023-24, from 6% in the previous year
- The Committee had recommended that the risk provisioning under the CRB be maintained within a range of 6.5-5.5% of the RBI's balance sheet.

14. Price Stabilisation Fund

Context:

The union government has planned to expand the irradiation process to boost the shelf life of the onion buffer stock under the Price Stabilisation Fund.

- The Price Stabilisation Fund was introduced to address the price volatility of essential agricultural commodities such as onions, potatoes and pulses.
- It was introduced as an intervention mechanism to stabilize the prices of the commodities in 2014-15 with a corpus of 500 crore rupees.

Agriculture commodities covered – Onions, potatoes and pulses.

- Recent developments – Recently the union government has approved inclusion of wheat and rice under the price stabilization fund (PSF).
- To promote direct purchase from farmers or farmers' association at farm gate or Mandi.
- To maintain a strategic buffer stock that would discourage hoarding and unscrupulous speculation.
- To protect consumers by supplying such commodities at reasonable prices through calibrated release of stock.

Interest free advance or loans – The interest free advance towards working capital is provided to the procurement agencies to enable the procurement of perishable agrihorticulture produce.

The interest free advance is provided to the following:

- State Government/Union Territories (UTs) and
- Central Agencies/Central PSUs/Cooperative organizations as decided by respective Ministries.

Fund management – PSF is managed by the Price Stabilisation Fund Management Committee (PSFMC).

- **Function of PSFMC** – Releases from the Fund will be made subject to approval of PSFMC only.
- **PSFMC may decide on addition of other Agri-commodities, if need so arises, in order to increase availability of the same.**
- It will monitor the progress of implementation of the Price Stabilization Operations by the implementing agency.
- **PSFMC works under the aegis of Ministry of Consumer Affairs, Food and Public Distribution.**

15. Cost Inflation Index

Context:

Recently, the income tax department has notified the Cost Inflation Index for the current fiscal beginning April 2024.

About Cost Inflation Index:

- **The CII number is used to adjust the purchase price of assets on the basis of inflation.**
- **CII is notified under the Income-tax Act, 1961 every year.**
- The CII number helps an individual to ascertain the inflation-adjusted current price of an asset.
- This helps in calculating capital gains from a transfer or sale of capital assets after taking inflation into account.

- **Capital gain** refers to the profit acquired from the sale/transfer of any capital assets, including land, property, stocks, shares, trademarks, patents, etc.
- **Normally, an asset is required to be retained for more than 36 months (24 months for immovable property and unlisted shares, 12 months for listed securities) to qualify as 'long-term capital gains'.**
- It helps taxpayers offset the impact of inflation as the difference between the purchase and sale price could be substantial due to rising prices.
- The application of the Cost Inflation Index for capital gain adjusts the purchase price of assets based on their sale price, resulting in smaller earnings and a lower tax amount.
- **From FY 2023-24, the indexation benefit on long-term capital gains from non-equity mutual fund schemes has been removed.**
- A taxpayer will continue to use the CII number to calculate long-term capital gains from house property, land, and building in the event of a sale.

16. KUSUM Scheme

Context:

The Ministry of Renewable Energy recently issued a warning to farmers on PMKUSUM website against fake websites and mobile applications that provide fake online application forms and demand registration fees for installing solar water pumps under PM Kusum scheme. The eligible categories for KUSUM Scheme are:

- **An individual farmer.**
- **A group of farmers.**
- **FPO or Farmer producer organization.**
- **Panchayat.**
- **Co-operatives.**
- **Water User Associations.**

About PM-KUSUM Scheme

- The PM-KUSUM Scheme was launched in 2019 for de-dieselisation of the farm sector and enhancing the income of farmers.
- It is aimed at ensuring energy security for farmers in India, along with honouring India's commitment to increase the share of installed capacity of electric power from nonfossil-fuel sources to 40% by 2030 as part of Intended Nationally Determined Contributions (INDCs).
- The scheme aims to add Solar capacity of about 34,800 MW by March 2026 with the total Central Financial support of Rs 34,422 crore.
- **Nodal Ministry:** Ministry of New and Renewable Energy (MNRE)
- Under the Scheme, a central government subsidy upto 30% or 50% of the total cost is given for the installation of standalone solar pumps and also for the solarization of existing grid-connected agricultural pumps.
- Further, farmers can also install grid connected solar power plants up to 2MW, under the Scheme on their barren/fallow land.
- This scheme is being implemented by the designated departments of the State Government.

The Scheme consists of three components:**Component A:**

- 10,000 MW of solar capacity through the installation of small Solar Power Plants of individual plants of capacity up to 2 MW.
- The solar power plants will be preferably installed within five kilometre radius of the notified substations in order to avoid high cost of transmission lines and losses.
- The power generated will be purchased by the local DISCOM at a pre-fixed tariff determined by the respective State Electricity Regulatory Commission (SERC).

Component B:

- Installation of 20 lakhs of standalone Solar Powered Agriculture Pumps.
- Individual farmers will be supported to install standalone solar Agriculture pumps of capacity up to 7.5 HP for the replacement of existing diesel Agriculture pumps / irrigation systems in off-grid areas, where grid supply is not available.
- The State Government will give atleast subsidy of 30% and the remaining will be provided by the farmer.

Component C:

- For Solarisation of 15 Lakh Grid Connected Agriculture Pumps.
- Under this Component, individual farmers having grid connected agriculture pump will be supported to solarise pumps.
- The farmer will be able to use the generated solar power to meet the irrigation needs and the excess solar power will be sold to DISCOMs at pre-fixed tariff.

17. Production of Pulses in India**Context:**

In April 2024, the annual retail inflation for pulses was 16.84% and the imports hit a seven-year high.

Production of Pulses in India:

- India is the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of pulses in the world.
- Pulses account for around 20 percent of the area under food grains and contribute around 7-10 percent of the total foodgrains production in the country.
- Though pulses are grown in both Kharif and Rabi seasons, **Rabi pulses contribute more than 60 percent of the total production.**
- **Gram is the most dominant pulse having a share of around 40 percent in the total production followed by Tur/Arhar at 15 to 20 percent and Urad/Black Matpe and Moong at around 8-10 percent each.**

- The regions with high productivity are Punjab, Haryana, Western Uttar Pradesh, West Bengal delta region, coastal Andhra Pradesh, Tamil Nadu, Kerala, coastal and eastern Karnataka and some parts of Maharashtra.

Surge in imports of Pulses:

- India's pulses imports were valued at \$3.75 billion in 2023-24 (April-March), the highest since the record \$3.90 billion and \$4.24 billion of 2015-16 and 2016-17.
- In quantity terms, import of major pulses totalled 4.54 mt in 2023-24, up from 2.37 mt and 2.52 mt in the preceding two fiscals, although lower than the all-time-highs of 5.58 mt, 6.36 mt and 5.41 mt in 2015-16, 2016-17 and 2017-18 respectively.
- **Domestic production:** There is a decline in domestic pulses production from 27.30 million tonnes (mt) in 2021-22 and 26.06 mt in 2022-23 to 23.44 mt in 2023-24, as per the Agriculture Ministry's estimates.

Reasons for Low Production in India:

- **Low Productivity:** Pulses have traditionally been a neglected crop because of the instability of its yields.
- **Climate Variability:** Pulses are often grown in rainfed areas where they are highly susceptible to climate variability, like erratic rainfall, droughts etc. which led to yield fluctuations and lower production.

○ **The El Nino-induced patchy monsoon and winter rain, is causing a decline in domestic pulses production in 2023-24.**

- **Residual Crop:** Pulses in India are considered a residual crop and grown under rain-fed conditions in marginal/less fertile lands, with very little focus on pest and nutrient management.
- **Preference for Cash Crops:** Farmers may prefer cultivating cash crops such as rice, wheat, and sugarcane over pulses due to assured procurement, higher market prices, and perceived lower production risks.

- **Post Harvest Losses:** There are postharvest losses during storage, due to excessive moisture and attack by stored grain pests especially the pulse beetle
- With the advent of the Green Revolution, which promoted rice and wheat, pulses were pushed to the marginal lands. This resulted in decline in productivity and land degradation.
- Penetration and adoption of high yielding varieties (HYV) seeds are also low.

18. ZiG

Context:

Recently, to address its long-standing economic instability, the Reserve Bank of Zimbabwe (RBZ) has launched a new goldbacked currency called the ZiG.

About ZiG:

- The Zimbabwe Gold (ZiG) is a new gold-backed currency launched by Zimbabwe.
- The ZiG, now the sixth currency used by Zimbabwe, has been in circulation since April 5, 2024.

Key features of ZiG:

- The ZiG stands out as a new currency backed by gold reserves, ensuring its value is supported by the physical gold held by the government.
- ZiG notes and coins will be available and issued in denominations: 1ZiG, 2ZiG, 5ZiG, 10ZiG, 20ZiG, 50ZiG, 100ZiG, and 200ZiG, with the gold backing aims to provide stability and prevent currency devaluation.

Reasons for launching new currency:

Zimbabwe has grappled with high inflation, with rates surpassing 500% in recent years.

Consequently, the Zimbabwean dollar, introduced in 1980, lost its value due to hyperinflation.

Following this, the country relied on various currencies, primarily the US dollar, leading to limited control over its economy.

- The collapse of the Zimbabwean dollar in 2009, with hyperinflation peaking at 5 billion per cent, marked one of the most severe currency crashes in history.

- Banks in Zimbabwe have been converting the previous national currency, the Zimbabwe dollar, into ZiGs, aiming to promote simplicity, certainty, and predictability in monetary and financial matters.

19. External Commercial Borrowings (ECBs)

Context:

Registrations by Indian companies for external commercial borrowings (ECBs) almost doubled to \$49.2 billion in the financial year 2023-24 (FY24) from \$26.6 billion in FY23, according to data from the RBI.

About External Commercial Borrowings (ECBs):

- **ECBs refer to the borrowing of funds by Indian companies from foreign sources in the form of loans, bonds, or other financial instruments.**

- **Purpose:** It can be used to finance a variety of purposes, including the expansion of business, the acquisition of assets, and the repayment of existing debt.

- **Source of ECBs:** ECBs can be obtained from a variety of sources, including foreign banks, international financial institutions, and foreign subsidiaries of Indian companies.

- **ECB can be in the form of rupeedenominated loans, which are repaid in Indian rupees, or foreign currencydenominated loans, which are repaid in a foreign currency.**

- **Regulation: ECB is subject to regulatory oversight by the RBI, which sets limits on the amount of ECB that Indian companies can obtain and the purposes for which it can be used.**

- The ECBs fall under the umbrella of RBI regulations as postulated under the Master Direction - External Commercial Borrowings, Trade Credits, and Structured Obligations (Master Direction), and the Foreign Exchange Management Act, 1999 (FEMA).

- ECBs should adhere to criteria like minimum maturity period, maximum all-in-cost ceiling, permitted and non-permitted enduses, etc.

- As of today, there are two paths to raise funds by employing ECBs: the approval route and the automatic route.
- There are a variety of eligibility regulations created by the government for availing of finance under the automatic route.
- These regulations are in relation to amounts, industry, the end-use of the funds, etc. Companies that desire to raise finance via ECB must necessarily meet these eligibility criteria; thereafter, funds can be raised without the need for approval.
- The approval route, on the other hand, mandates that companies which fall under certain pre-specified sectors must obtain the RBI's or the government's explicit permission, prior to raising funds through ECB.
- **As per RBI guidelines, all entities except a Limited Liability Partnership are allowed to raise ECBs.**

Benefits:

- ECBs provide an opportunity to borrow large volumes of funds.
- The funds are available for a relatively long term.
- Interest rates are also lower compared to domestic funds.
- ECBs are in the form of foreign currencies. Hence, they enable the corporate to have foreign currency to meet the import of machineries etc.

Risks:

- **Exchange rate risk:** Fluctuations in the value of the Indian rupee against foreign currencies can affect the cost of repaying the loan.

Sovereign risk: The ability of a foreign government to repay its debt can affect the creditworthiness of foreign lenders.

- **Credit risk:** Foreign lenders may not have the same level of protection as domestic lenders in the event of default.
- **Regulatory risk:** Changes to government regulations or policies related to the ECB can affect the availability and cost of borrowing.



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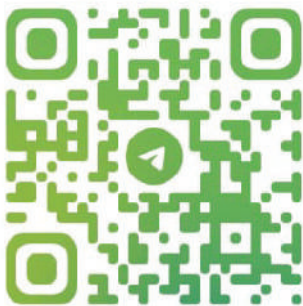
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11	CA February 2025	16-03-2025
12	CA March 2025	13-04-2025
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GEOGRAPHY

1. Great Rift Valley

Context:

At least 42 people died when a dam burst its banks near a town in Kenya's Rift Valley, as heavy rains and floods battered the country. Great Rift Valley:

- It is one of the most extensive rifts on Earth's surface that runs along part of East Africa.
- It runs for 4,000 miles (6,400 kilometres), from Jordan in southwestern Asia to the coast of the Indian Ocean in central Mozambique.

- It runs across many countries:

Eritrea, Djibouti, Ethiopia, Kenya, Tanzania, Uganda, Rwanda, Burundi, the Democratic Republic of the Congo (DRC), Malawi, Zambia, and Mozambique.

- It is part of a larger feature called the East African Rift System (EARS).

Formation:

- The valley is situated in a region where three tectonic plates meet.
- It was formed about 40 million years ago when tectonic plates split and gave rise to the East African Rift.
- The valley is 30 to 40 miles (48 to 64 kilometres) wide on average but reaches nearly 300 miles (480 kilometres) at its widest section in the Danakil Desert in northeastern Africa.
- The area is geologically active and features volcanoes, hot springs, geysers, and frequent earthquakes.
- A series of some thirty lakes lies along its length; the three largest in Africa are known as the Great Lakes and include Lake Tanganyika, the second deepest lake in the world, and Lake Victoria, the second-largest freshwater lake by surface area in the world.
- Many of Africa's highest mountains—including Mount Kilimanjaro, Mount Kenya, and Mount Margherita—are in ranges fronting the Rift Valley.

2. Blood Minerals

Context:

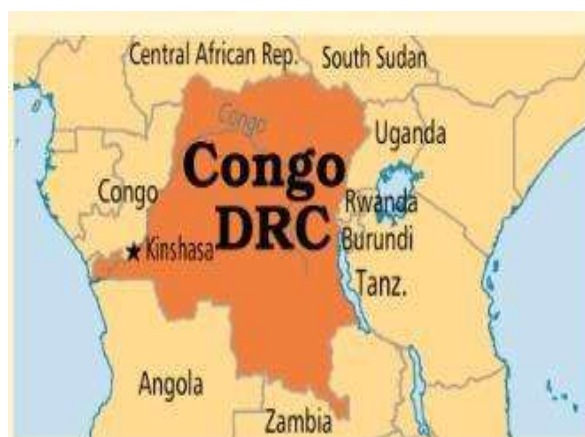
Recently, the Democratic Republic of the Congo (DRC) has accused Apple of using 'blood minerals' (illegally exploited minerals) extracted from the eastern region of the country.

About the Blood Minerals

- Blood minerals, also known as conflict minerals, refer to tin, tantalum, tungsten, and gold (collectively known as 3T or 3TG), which are mined in conditions of armed conflict and human rights abuses.
- These minerals are essential components in the manufacturing of a wide range of products, from smartphones and laptops to cars and aircraft.

Heart of the Issue

- DRC is one of the most mineral-rich regions in the world, but it is also one of the most conflict-ridden.
- The DRC's eastern region, home to vast deposits of 3TG minerals, has been plagued by violence for decades.
- The minerals are often extracted under brutal conditions, with local communities suffering from grave human rights violations.
- Women and children are often the most affected, being deprived of their homes, subjected to sexual violence, or forced to work in the mines.



3. Places in News

Places in news	Located in
1. Lake Assal	Djibouti
2. Isfahan	Iran
3. Nakuru Dam	Kenya
4. Kiru Hydro Electric Project	India

Lake Assal – Djibouti.

- Lake Assal is a saline lake which lies 155 m below sea level in the Afar Triangle, making it the lowest point on land in Africa and the third-lowest point on Earth after the Sea of Galilee and the Dead Sea.

Isfahan – A central city in Iran.

- Recently Iran's air defences have brought down three small drones over the central city of Isfahan.

Kiru Hydro Electric Project – Located in Kishtwar, J&K of India.

- Recently REC Limited has extended the term loan for this project.
- REC Limited is a Maharatna Central Public Sector Enterprise and leading NBFC under the Ministry of Power.

Solai/ Nakuru Dam – It is located in Nakuru County of Kenya.

- A blockage in an underpass or tunnel that channels water to the Tongi River led to the bursting of a dam.

4. Pyrenees**Context:**

The French President recently hosted Chinese President Xi Jinping at the Tourmalet Pass in the Pyrenees for private meetings. About Pyrenees Mountains:

- The Pyrenees are a chain of mountains in southwestern Europe that form a natural border between Spain and France.
- It is a fold mountain chain created by the continental collision of the microcontinent of Iberia with the massive Eurasian plate.
- They are quite old mountains in comparison to the Alps.
- It extends for about 500 km from the coasts of the Mediterranean Sea in the east to the Bay of Biscay (Atlantic Ocean) in the west.
- At the eastern end, it is six miles wide and 80 miles wide at the centre.
- Politically, it is divided into the Spanish and French Pyrenees. The tiny country of Andorra is found sandwiched between them, in the eastern part of the Pyrenees Mountains.
- It separates the rest of continental Europe from the Iberian Peninsula.
- The western end of the Pyrenees Mountains merges with the Cantabrian Mountains, located in the northern part of the Iberian Peninsula.

Located in Spain, Aneto Peak, is the highest mountain peak in the Pyrenees Mountains (3,404 m).

5. Indian Ocean Dipole**Context:**

Positive Indian Ocean Dipole (IOD) or Indian Nino may re-emerge for the second consecutive year in the latter half of 2024. It is for the first time since 1960 that the event is recurring for a second consecutive year since record-keeping began. About Indian Ocean Dipole (IOD)

• It is a climate pattern affecting the Indian Ocean and it results in irregular oscillations of sea surface temperatures.

• During a positive phase, warm waters are pushed to the Western part of the Indian Ocean, while cold deep waters are brought up to the surface in the Eastern Indian Ocean.

• This pattern is reversed during the negative phase of the IOD.

Impact: The IOD influences the local weather causing heavy rains and/or droughts in Africa and Australia.

• The associated sea-level changes can also lead to increased threats of coastal flooding and associated impacts.

• A positive IOD can help rainfall in the Indian subcontinent and along the African coastline, while reducing rainfall in Australia, south-east Asia, and Indonesia.

How it affects India: A positive IOD can boost the performance of India's southwest monsoon, depending on when it develops.

• For example, in 2019, a strong IOD event that developed during the late monsoon season compensated for a 30 per cent rainfall deficit in June

• The development IOD will likely boost the Indian agriculture sector.

• Also, it is likely to recharge reservoirs and other water sources, where the storage level is precarious.

5. Black Sea

Context:

Ukraine's exploding drone boats appear to be hunting down smaller, high-speed vessels in the Black Sea after Russia pulled back its larger warships following a spate of devastating attacks.

Major rivers	Sea in which it drains
1. Danube	Black Sea
2. Tagus	Atlantic Ocean
3. Don	Sea of Azov
4. Rhine	North Sea

About Black Sea:

• It is a large inland sea located at the southeastern extremity of Europe. It covers an area of approximately 436,000 square kilometres (168,000 square miles).

• **Bordering countries:** It is bordered by Ukraine to the north, Russia to the northeast, Georgia to the east, Turkey to the south, and Bulgaria and Romania to the west.

• Russia has the longest coastline on the sea (2,300 km), followed by Turkey (1,329 km) and Ukraine (1,282 km).

• The Crimean Peninsula extends into it from the north.

• It is connected with the Aegean Sea (an arm of the Mediterranean Sea) through the Bosphorus Strait, the Sea of Marmara, and the Dardanelles Strait, and with the Sea of Azov by the Kerch Strait.

• Created when structural upheavals in Asia Minor split off the Caspian basin from the Mediterranean Sea, the Black Sea gradually became isolated; salinity is now less than half that of the world's oceans.

• The Black Sea receives freshwater inflows all around the basin. It is a meeting point for many rivers, such as the Danube, Southern Bug, Dnieper, Rioni, and Dniester.

• It is the largest meromictic basin, which means the movement of water between the lower and upper layers of the Sea is rare.

• It is one of the world's largest anoxic basins, meaning it has areas with very little dissolved oxygen.

Islands: It contains several islands, with the largest ones being Snake Island (Ukraine), Giresun Island (Turkey), and St. Ivan Island (Bulgaria).

6. Shinkun La Tunnel

Context:

The Border Roads Organisation (BRO) is preparing to commence the construction of the Shinkun La Tunnel.

<i>Passes</i>	<i>Connecting points</i>
1. <i>Khardung La</i>	<i>Leh with Shyok Valley</i>
2. <i>Chang La</i>	<i>Leh with Changthang plateau (Tibet)</i>
3. <i>Nathu La</i>	<i>Sikkim with Tibet</i>
4. <i>Shinkun La</i>	<i>Lahaul Valley with Zaskar Valley</i>

About Shinkun La Tunnel:

- It is an upcoming motorable tunnel under the 16,580 feet high Shinku-La pass between Himachal's Lahaul valley and Ladakh's Zaskar valley. It is located on the Nimu-PadamDarcha Road link. After completion, the Shinku-la tunnel will be the longest high altitude highway tunnel in the world.
- It will provide all-weather road connectivity to Ladakh, and this will be the shortest route to the border areas of Ladakh. The Border Roads Organization (BRO) will construct the tunnel.
- It is expected to streamline the transportation of heavy machinery to strategic locations such as Kargil, Siachen, and the Line of Control (LOC), reducing travel distances by approximately 100 km.

- The traffic movement in the tunnel will not be vulnerable to long-range artillery shelling or missile firings, either by China or Pakistan.

7. Strategic maritime investments

Context:

India's recent forays into strategic maritime investments reflect a concerted effort to counterbalance China's growing influence in the region.

Sri Lanka:

- Hambantota port ? Kankasanturai Port in the Northern Province with 100% Indian funding.

Israel

- Haifa - Israel's second-largest port.

Iran:

- Shahid Beheshti Port - Iran's sole deep-sea port with direct access to the ocean.
- Chabahar Port

Myanmar:

- Sittwe Port, part of the Kaladan

Multi-Modal Transit Transport Project.

- Kyaupkyu port.

Oman: ? Port of Duqm

Kenya:

- Mombasa



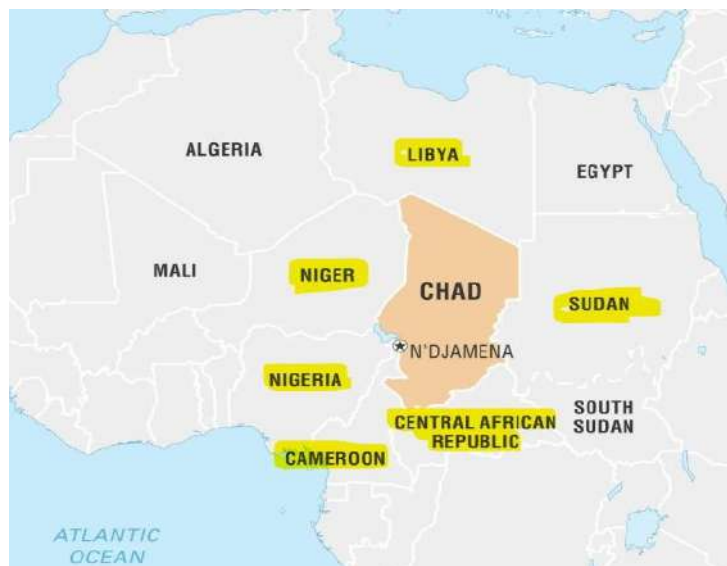
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8. Chad

Context:

Chad polling to vote for a new president aimed at ending military rule. Land borders: Libya (north), Sudan (east), the Central African Republic (south), Cameroon, Nigeria, and Niger (west).



8. Wetlands in news

Context:

Constructed wetlands are nature's solution for wastewater treatment in India.

Wetlands	Located in
1. Ashtamudi Wetland	Kerala
2. Hokera wetland	Jammu and Kashmir
3. Kanjli Wetland	Punjab
4. Rudrasagar Lake	Tripura

Constructed Wetlands Constructed wetlands are engineered structures designed to replicate the functions of natural wetlands. They are composed of meticulously chosen vegetation, soil and water, orchestrated to facilitate a seamless process of purification.

They are divided into two categories: subsurface flow (SSF) and surface flow (SF).

- SSF wetlands direct wastewater through gravel beds or porous media, promoting microbial activity that degrades organic matter.
- In contrast, SF wetlands demonstrate their aesthetic appeal above the water's surface, with gently flowing streams and lush vegetation.

One such example is the Asola Bhatti Wildlife Sanctuary in Delhi, situated on the city's outskirts.

- Here, a constructed wetland system aids in purifying sewage from nearby settlements while also providing a sanctuary for diverse flora and fauna, thus contributing to regional biodiversity conservation.

The Kolkata East Wetlands in West Bengal, designated as a Ramsar site, feature a vast network of natural and constructed wetlands.

9. Important Ports in news

Context:

India recently signed a 10-year agreement with Iran to develop and manage the Chabahar port, marking a pivotal development in bilateral ties between the two nations.

Important Ports	Located in
1. Port of Algeiras	Spain
2. Hanshin Port	Japan
3. Port Klang	Malaysia
4. Port of Bassein	Myanmar

About Chabahar Port:

- It is a deep-water port located in Iran's Sistan-Baluchistan province.
- It is on the Gulf of Oman at the mouth of the Strait of Hormuz.
- It is the only Iranian port having direct access to the Indian Ocean.
- It consists of two separate ports called Shahid Beheshti and Shahid Kalantari.

It's geographic proximity to countries such as Afghanistan, Pakistan, and India, as well as its status as a key transit centre on the burgeoning International North-South Transport Corridor (INSTC), gives it the potential to develop into one of the most important commercial hubs in the region.

- INSTC is a multi-modal transportation route linking the Indian Ocean and the Persian Gulf to the Caspian Sea via Iran, and onward to northern Europe via Saint Petersburg in Russia.

10. Sahul**About Sahul:**

- It can be termed as a supercontinent which stood exposed on the Earth's surface when humans were in the middle of what can be termed as the last ice age.
- Since the ice age led to glaciation of water levels on the planet, it ended up exposing parts of land like Sahul which connected to currently known Australia to Papua New Guinea in the north and Tasmania in the south.
- It helped humans in ancient times to cross continents from Asia to Australia almost 7,000 decades ago.

What is the Ice age period?

It is any geologic period during which thick ice sheets cover vast areas of land. Such periods of largescale glaciation may last several million years and drastically reshape surface features of entire continents.

- The earliest known took place during Precambrian time dating back more than 570 million years.
- The most recent periods of widespread glaciation occurred during the Pleistocene Epoch (2.6 million to 11,700 years ago).
- Ice ages are not uniformly cold. There can be colder and warmer periods during the overall ice-age period.

Colder periods lead to more extensive areas of continental ice sheets, valley glaciers and sea ice, while warmer periods lead to reduced areas of ice.

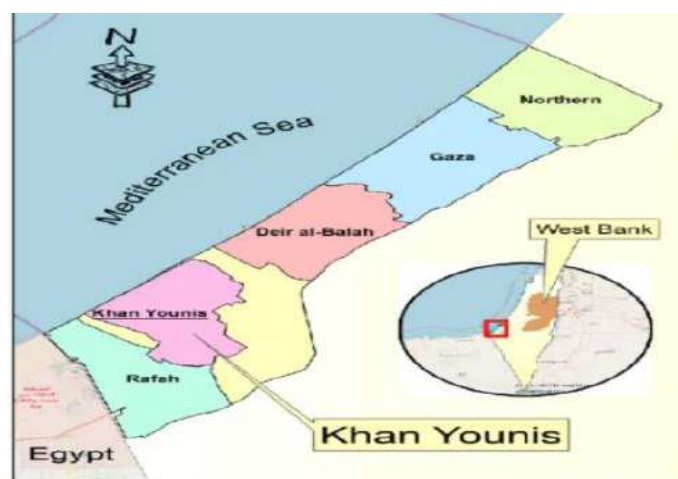
11. Montenegro

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12. Flash Floods in Sumatra**Context:****Flash flood hits west Sumatra of Indonesia****13. Places in news****Context:**

Recently, Iran's President Ebrahim Raisi and Foreign Minister Hossein Amirabdollahian died in a helicopter crash in the East Azerbaijan province of Iran. Recently, Spain has refused permission for an Israel-bound ship carrying arms to call at the southeastern port of Cartagena.



Places in news	Located in
a) East Azerbaijan province	Iran
b) Khan Younis	Gaza Strip
c) Cartagena	Spain
d) Odessa	Ukraine

14. Albania**Context:**

On the roof of the mayor's office in Albania's capital Tirana a lesbian couple held an unofficial wedding ceremony on Sunday, a symbolic move they hope will promote LGBT+ rights in Albania.

**15. Baltic Sea****Context:**

Leaders around the Baltic Sea reacted to reports that Russia could revise the borders of its territorial waters in the region.

About:

- The Baltic Sea is the youngest sea on the planet, emerging some 10,000-15,000 years ago as the glaciers retreated at the end of the last Ice Age.
- **It is located in Northern Europe, enclosed by Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Russia, and Sweden.**
- It is one of the planet's largest bodies of brackish water, where salt water from the North-East Atlantic blends with fresh water from the surrounding rivers and streams.

**16. Mexico****Context:**

Historic election on Sunday will likely give Mexico its first woman President.

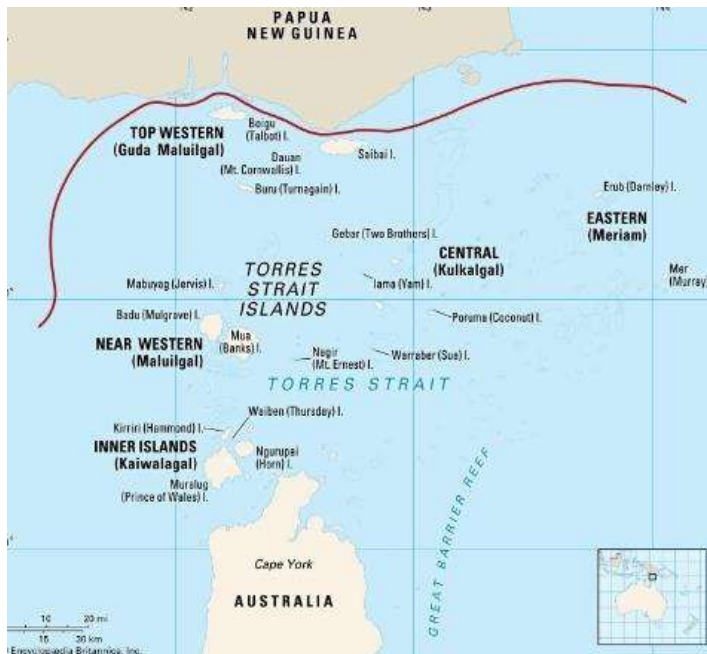


17. Important Straits

Context:

Recently, Papua New Guinea was in news. Torres Straits:

- The strait that separates Papua New Guinea from Australia is the Torres Strait. It lies between the northern tip of Queensland, Australia, and the southern coast of Papua New Guinea's island region. The Torres Strait is an important waterway for maritime transportation and serves as a boundary between the two countries.



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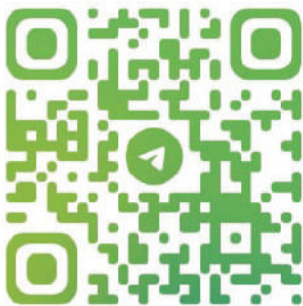
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ENVIRONMENT

1. Methane

Context:

An intensive modelling study has found methane emissions from fossil fuels declined between 1990 and the 2000s whereas microbes have been producing more methane of late.

Sources of Methane:

- The sources of methane mostly fit in two categories: biogenic and thermogenic.
- Thermogenic methane is released, when fossil fuels such as natural gas or oil are extracted from deep within the earth's crust.
- Biogenic methane comes from microbial action.

Biogenic methane:

- The microbes that produce methane are archaea — single-celled microorganisms distinct from bacteria and eukaryotes — and are called methanogens.
- They thrive in oxygen-deficient environments, such as the digestive tracts of animals, wetlands, rice paddies, landfills, and the sediments of lakes and oceans.

Impact

- Methanogens play a crucial role in the global carbon cycle by converting organic matter into methane.
- While methane is a potent greenhouse gas, its production by methanogens is an essential part of natural ecosystems. But human activities like agriculture, dairy farming, and fossil fuel production have further increased methane emissions.

Methane Gas

- Methane (CH₄) is a colourless, odourless and highly flammable gas.
- Methane is a powerful and shortlived greenhouse gas, with a lifetime of about a decade and Global Warming Potential about 80 times greater than that of carbon dioxide (CO₂) during the 20 years after it is

2. New Collective Quantitative Goal

Context:

Climate experts believe that the focus of this year's climate change conference in Baku, Azerbaijan COP 29 scheduled for November will be on finance. As per them, the expression that is likely to be heard most frequently at COP29 is NCQG — or New Collective Quantitative Goal.

- NCQG (New Collective Quantified Goal (NCQG)) is a term for the extra money that rich countries need to gather each year starting from 2025.
- This money is meant to support actions against climate change in poorer countries. It has to be more than the \$100 billion that rich countries promised to collect each year starting from 2020, but didn't manage to do.
- The last year COP at Dubai was all about Global Stocktake (GST), a review of ongoing climate action.
- Climate experts believe that the focus of this year's climate change conference in Baku, Azerbaijan (COP 29) will be on finance. As per them, the expression that is likely to be heard most frequently at COP29 is NCQG — or New Collective Quantitative Goal (on finance).
- India has called for developed countries to provide at least \$1 trillion per year in climate finance to developing countries from 2025, primarily in the form of grants and concessional finance.
- G-20 New Delhi Leader's Declaration also recognizes the substantial financial requirements essential for the world's successful transition to a renewable energy-driven economy.



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3. Hydropower

Context:

Droughts — and sudden floods which can damage hydropower dams — made more frequent and severe by climate change are an “increasing concern” for hydropower.

About:

- Recent droughts in Colombia and Ecuador have severely hampered energy supplied by hydropower.
- This has led Ecuador to declare a state of emergency and institute power cuts.
- Hydropower accounts for over 80% of electricity generation in the Democratic Republic of Congo, Ethiopia, Malawi, Mozambique, Uganda and Zambia — many of which are also struggling with severe droughts.

What is Hydropower?

- Hydropower, or hydroelectric power, is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity.
- Hydropower currently generates more electricity than all other renewable technologies combined and is expected to remain the world's largest source of renewable electricity generation into the 2030s.

Classification of Hydro Projects based on Installed Capacity:

- Micro: upto 100 KW
- Mini: 101KW to 2 MW
- Small: 2 MW to 25 MW
- Mega: Hydro projects with installed capacity $\geq$ 500 MW

India: In 2022-23, hydropower accounted for 12.5 percent of power generation in India. India had about 4745.6 MW pumped storage capacity in operation in 2023.

- The hilly States of India mainly Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir and Uttarakhand constitute around half of this potential

- Other potential States are Maharashtra, Chhattisgarh, Karnataka and Kerala.

Small hydro is defined as any hydropower project which has an installed capacity of less than 25 MW. It is in most cases run-of-river, where a dam or barrage is quite small, usually, just a weir with little or no water is stored. **Run-of-river hydropower is a facility that channels flowing water from a river through a canal or penstock to spin a turbine.**

Pumped storage hydropower provides peak-load supply, harnessing water which is cycled between a lower and upper reservoir by pumps which use surplus energy from the system at times of low demand.

4.. Important Tiger Reserves

Context:

Recently, the number of people visiting the Bhadra tiger reserve for safari has gone up and the tourists need to take adequate care not to disturb this eco-sensitive zone.

<i>Tiger</i>	
<i>Reserve</i>	<i>Located in</i>
1. Bhadra Tiger Reserve	Karnataka
2. Valmiki Tiger Reserve	Bihar
3. Pakke Tiger Reserve	Arunachal Pradesh
4. Amrabad Tiger Reserve	Telangana

About Bhadra Tiger Reserve:

- It is situated in the midst of the Western Ghats region of Karnataka.**

- The reserve is unique as it is nestled within several hill ranges. The habitat has a good population of elephants and is also an Elephant Reserve.
- It boasts of a substantial tiger population and as such the sanctuary was declared the 25th Project Tiger reserve of India in 1998.
- **Rivers:** It is well drained by the river Bhadra and its tributaries.
- **Vegetation:** It has dry-deciduous, moist-deciduous, shola, and semievergreen patches.
- **Flora:** Teak, Rosewood, Mathi, Honne, Nandi and many medicinal plants etc.
- **Fauna:** Tiger, Leopard, Leopard cat, Dholes, Indian Civet, ungulates like Gaur, Sambar and Barking Deer are common.
- **Other Tiger Reserves of Karnataka:** Bandipur, Nagarhole, Dandeli-Anshi and Biligiriranga Tiger Reserve

5. Sodium

Context:

The World Health Organization (WHO) has recently released the second edition of its global sodium benchmarks to prevent chronic conditions related to high blood pressure and obesity.

About:

- Sodium is an essential nutrient necessary for maintenance of plasma volume, acid-base balance, transmission of nerve impulses and normal cell function.
- Sodium deficiency is extremely unlikely in healthy individuals.
- Excess sodium is linked to adverse health outcomes, including increased blood pressure.
- Sodium is found naturally in a variety of foods, such as milk, meat and shellfish.
- It is often found in high amounts in processed foods such as breads, processed meat and snack foods, as well as in condiments (e.g., soy and fish sauce).

- **Reducing sodium intake is an effective way to reduce the burden of cardiovascular diseases and other diet- and nutrition-related NonCommunicable Diseases.**

WHO global sodium benchmarks – The first edition of the WHO global sodium benchmarks, published in May 2021, contained 10 pre-determined benchmarks for different food categories.

- It included whole foods, fruits and vegetables, dairy products, and fortified foods.
- The benchmarks are in the form of maximum limits because this was considered to be the most feasible approach for global benchmarks.
- It has established the second edition of the global benchmarks for sodium levels in 70 food subcategories, which is an updated edition of the first edition.
- The second edition builds on these findings and expands the coverage of each category to include more information on how to set national targets for sodium reduction.
- The development of the second edition of the WHO global sodium benchmarks was a collaborative effort among governments, national and international organizations and private sector partners.
- **It is a part of a broader WHO initiative to reduce sodium consumption with the aim of achieving a target of less than 5g of salt per day by 2025.**
- **Recommendations –** When countries set up national sodium targets, it is recommended to set up mandatory targets in the form of maximum limits.
- Mandatory targets are recommended as they drive larger reduction in sodium intake than do voluntary targets.

6. Carbon Farming:

- Carbon farming (also known as carbon sequestration) is a system of agricultural management that helps the land store more carbon and reduce the amount of GHG that it releases into the atmosphere.
- It involves practices that are known to improve the rate at which CO₂ is removed from the atmosphere and converted to plant material and soil organic matter.
- Carbon farming is successful when carbon gains resulting from enhanced land management or conservation practices exceed carbon losses.

Methods for Carbon Farming: Forest Management:

Healthy forests absorb and hold CO₂ emissions produced from other sources. Carbon offsets can be created by:

- Avoiding deforestation
- Permanent land conservation
- Reforestation and replanting activities
- Improved forest management

Grasslands Conservation: It includes maintaining native plant life through permanent land conservation and avoiding conversion of grasslands for commercial development or intensive agriculture. **Mixed Farming:** A climate-friendly strategy of raising livestock and crops together.

- Rotating cows among pastures allows grasses to recover from grazing and the animals' manure and the impacts of their grazing regenerate carbon in soils.

Using Cover Crops: These crops are planted to cover the soil rather than for the purpose of being harvested. They are planted after the harvest of the main crop.

- They return more carbon to the soil and sustain soil microbes that play key roles in carbon storage.

Reduction of Soil Tillage: Tillage is normally used to loosen and aerate the soil and to remove initial weeds.

- However, tillage increases carbon mineralization (decomposition of chemical compounds in organic matter) leading to CO₂ emissions from the soil.

- Reducing the soil disturbance is a useful tool to protect soil organic matter.

Wetland Restoration: Wetland soil is an important natural carbon pool or sink as the wetlands conserve about 14.5% of the soil carbon found in the world.

An international initiative called "4 per 1000," showed that increasing soil carbon worldwide by just 0.4% yearly could offset that year's new growth in CO₂ emissions from fossil fuel emissions. The '4 per 1,000' initiative was launched by the France government at the COP21 Paris climate summit in 2015.

The aim of the initiative is to demonstrate that agriculture, and in particular agricultural soils, can play a crucial role where food security and climate change are concerned.

7. Global Biofuel Alliance**Context:**

The Global Biofuel Alliance (GBA) has adopted a work plan focused on assessing country landscapes, drafting policy frameworks, and conducting biofuel workshops.

About Global Biofuel Alliance (GBA):

- It is a multi-stakeholder alliance of Governments, International Organizations and Industries.
- It was launched on the sidelines of the 2023 G20 summit in New Delhi.**
- It is an initiative by India, bringing together the biggest consumers and producers of biofuels to drive the development and deployment of biofuels.
- It aims to position biofuels as a key to the energy transition and contribute to jobs and economic growth.**

Significance of the alliance:

- It will place emphasis on strengthening markets, facilitating global biofuels trade, development of concrete policy lesson-sharing and provision of technical support for national biofuels programs worldwide.

- It intends to expedite the global uptake of biofuels through facilitating capacity-building exercises across the value chain, technology advancements, and intensifying the utilization of sustainable biofuels through the participation of a wide spectrum of stakeholders.
- It will facilitate the development, adoption, and implementation of internationally recognized standards, codes, sustainability principles, and regulations to incentivize biofuel adoption and trade. It will also act as a central repository of knowledge and an expert hub.

24 countries and 12 international organizations have already agreed to join the alliance.

8. Mammoth carbon capture Plant

Context:

Recently, the world's largest facility designed to remove carbon dioxide from the atmosphere started operations in Iceland.

About Mammoth carbon capture Plant:

- **It is the largest carbon dioxide capture and storage facility of its kind and launched operations. It is situated on a dormant volcano in Iceland.**
- It is dubbed as "Mammoth," this plant is Climeworks' second commercial direct air capture (DAC) facility in the nation and is significantly larger than its predecessor, Orca, which began in 2021.

Working:

- This cutting-edge technology draws in air and chemically extracts carbon dioxide, which can then be stored underground, converted into stone, or reused.

The Swiss company Climeworks, in partnership with Icelandic company Carbfix, plans to sequester the captured carbon by turning it into stone beneath the earth's surface, utilizing Iceland's abundant geothermal energy to power the process.

What is direct air capture?

- This technology extracts CO₂ directly from the atmosphere at any location, unlike carbon capture which is generally carried out at the point of emissions, such as a steel plant.
- The CO₂ can be permanently stored in deep geological formations or used for a variety of applications.

9. Indian Ocean basin-wide (IOBW) Index

Context:

According to the study, the Indian Ocean basin-wide (IOBW) index exhibits a close association with dengue outbreaks in both the Northern and Southern hemispheres. About Indian Ocean basin-wide (IOBW) Index:

- **It represents the average sea-surface temperature variations across the tropical Indian Ocean.**
- **It has emerged as a key indicator for predicting the magnitude and timing of dengue epidemics in each country.**
- **IOBW index's association with the Southern Hemisphere is stronger than that with the Northern Hemisphere.**
- The index has a more pronounced impact on temperatures in tropical regions. Brazil, for example, bears a higher burden of dengue in the Southern Hemisphere.
- The Northern Hemisphere witnesses a peak dengue epidemic period between July and October and the Southern Hemisphere in February and April, both in the summers.
- Further, the amplitude of dengue incidence was high when the index was positive and low when it was negative.
- The link between the Indian Ocean's temperature and dengue incidence is likely due to its influence on regional temperatures through teleconnections, large-scale atmospheric patterns that can transfer heat and moisture across vast distances.

Key facts about Dengue:

- It is caused by the dengue virus (DENV)
- Transmission:** It is transmitted to humans through the bites of infected female mosquitoes, primarily the *Aedes aegypti* mosquito.
- The severe form of dengue fever, also called dengue haemorrhagic fever, can cause serious bleeding, a sudden drop in blood pressure (shock) and death.
- It is more common in tropical and subtropical climates.
- Symptoms:** The most common symptoms are high fever, headache, body aches, nausea and rash.

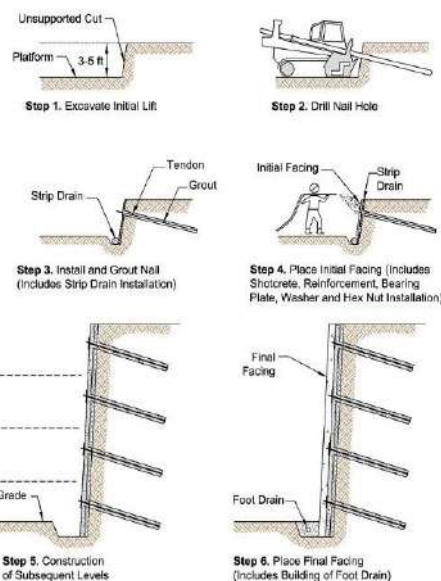
10. Soil nailing**Context:**

The Tamil Nadu State highways department is undertaking the stabilisation of slopes around the Nilgiris' major roads by growing grasses to prevent soil erosion.

The project, known as 'slope stabilisation using soil nailing and Hydroseeding method,' is being undertaken in Ketti, Kattabettu, Perar, Kudah and Udthagamandalam around Nilgiris'.

About:

- Soil nailing** – It is a geotechnical engineering technique that involves the insertion of reinforcing elements into the soil in a specified area to strengthen it.
- Types** - Drilled and grouted soil nailing, driven soil nailing, drilling soil nailing, jet grouted soil nailing and launched soil nailing.
- Basic technique** – Many holes are drilled in walls or slope face and then, nails are inserted in the predrilled holes.
- After that, the hole is filled with grouting materials such as concrete, shotcrete etc.
- Application** – It is used for slopes, excavations, retaining walls etc. to make the soil more stable.
- Hydroseeding is a process of applying a mixture of seeds, fertilizer, organic materials and water onto the

**11. United Nations Forum on Forests****Context:**

Delegates at the 19th Session of the United Nations Forum on Forests (UNFF19) entered into informal negotiations over the draft texts of the High-Level Declaration. About United Nations Forum on Forests:

It was established in 2000 by the UN Economic and Social Council of the United Nations (ECOSOC).

- It promotes the management, conservation, and sustainable development of all types of forests.

The Forum meets annually at the UN Headquarters in New York, bringing together representatives of all member states and forest-related agencies for high-level dialogue on technical matters in odd years and

- The forum has universal membership, and is composed of all Member States of the United Nations and specialized agencies.
- India is a founding member of UNFF.
- The declaration of the 19th session aims to achieve agreement on a highlevel political commitment to forest protection, with specific actions for effective implementation of the UN Strategic Plan for Forests (UNSPF) by UNFF and its stakeholders.
- United Nations Strategic Plan for Forests 2017-2030 (UNSPF) is a global framework to achieve the sustainable management of all types of forests, including trees outside forests, and to combat deforestation and forest degradation. It was adopted by the UN General Assembly in 2017.
- Its target is to increase forest area by 3% worldwide by 2030. The plan contains a set of six Global Forest Goals and 26 associated targets to be reached by 2030. All these are voluntary in nature and universally applicable.

12. World Wildlife Crime Report

Context:

The 3rd edition of the World Wildlife Crime Report probes recent trends in the illicit trafficking of protected species of wild fauna and flora. World Wildlife Crime Report, 2024 (WWCR3):

- Tagline – Trafficking in Protected Species
 - Published by – United Nations Office on Drugs and Crime (UNODC), every 4 years.
 - The 2 previous editions were published in 2016 and 2020 respectively.
- Aim – To provide a tool to assess and improve responses to wildlife trafficking.**
- Data sources – CITES Annual Illegal Trade Reports, supplementary seizure data collated by UNODC from diverse sources and verified with Member States.
 - It also Emphasis on systematic analysis of wildlife crime harms and impacts, factors driving crime

- WWCR3 includes over 140,000 records of wildlife seizures between 2015–2021 but the annual number of seizures reported for 2020 & 2021 was around half the number reported for each of the preceding 4 years.

Findings World Wildlife Crime Report, 2024

- **Seizures** – In 2015-2021, seizures of 13 million items showed an illegal trade in around 4,000 plant and animal species across 162 countries and territories.
- Corals (16%), crocodilians (9%) and elephants (6%).
- **Extinctions** – Crimes like the illegal collection of succulent plants and rare orchids, and trafficking of many kinds of reptile, fish, birds and mammals had played a key role in local or global extinctions.
- **Wildlife crime harms** – Beyond the threat to individual species, it harms ecosystems, their climate-related functions and also socioeconomic development.
- It further corrodes good governance and the rule of law through corruption, money-laundering and illicit financial flows.

13. Nairobi Declaration on fertiliser and soil health

Context:

African presidents have endorsed the Nairobi Declaration on fertiliser and soil health, committing to prioritise domestic fertiliser production and triple it in the next 10 years to boost agricultural production.

About

- The declaration has a raft of recommendations, pledges and demands believed to have boosted Africa's bargaining power on international platforms.
- It highlights green investment opportunities in Africa's emerging blue and green economies.
- It also urges world leaders to back a proposed "carbon tax on fossil fuel trade, maritime transport and aviation".
- While calling the international community to order, the declaration wants them to honour the annual climate finance pledge of \$100bn they made, as a matter of urgency.

- With many African countries having defaulted on loans from developed countries, the declaration proposes debt relief interventions.
- It recommends extending the debt repayment period and instituting a 10-year grace period to allow the borrowed funds to serve intended development goals

14. East Sundarbans

Context:

Recently, a fire broke out in the East Sundarbans region of Bangladesh, which is occurring almost every year during the dry season.

About the East Sundarbans:

- It is a part of the Sundarbans, world's largest mangrove forest, that stretches across the coastal region of the Bay of Bengal in the Indian Ocean.
- It is home to a wide variety of flora and fauna, including several endangered species.
- Reasons highlighted for repeatedly catching fire in East Sundarbans are reduced water inflow in canals, region's elevation, dry seasons, climate change, and lack of management.

Sundarbans Wetland and Mangrove Forest:

- It is one of the largest mangrove forests in the world (140,000 ha), lies on the delta of the Ganges, Brahmaputra and Meghna rivers on the Bay of Bengal in India and Bangladesh.
- The Indian Sundarbans, covering the south-westernmost part of the delta, constitutes over 60% of the country's total mangrove forest area and includes 90% of Indian mangrove species.

Fauna:

- **The Sundarbans are the only mangrove habitat which supports a significant population of tigers, and they have unique aquatic hunting skills.**

- **The Sundarbans Tiger Reserve has been declared a 'critical tiger habitat' under national law and also a 'Tiger Conservation Landscape' of global importance.**

- **It is home to a large number of rare and globally threatened species such as:**

1. Northern River Terrapin (Batagur Baska): Critically Endangered;
2. Irrawaddy Dolphin (Orcaella Brevirostris): Endangered;
3. Fishing Cat (Prionailurus Viverrinus): Vulnerable.

- Two of the world's four Horseshoe Crab Species, and eight of India's 12 species of Kingfisher are also found in Sundarbans.

Flora:

- The Sundarbans host more than 78 species of mangroves, making it the richest mangrove forest in the world.
- The Sundarbans is named after the mangrove plant Sundari (Heritiera Minor).

Significance:

- The mangrove forests protect the hinterland from storms, cyclones, tidal surges, and the seepage and intrusion of saltwater inland and into waterways.
- They serve as nurseries to shellfish and finfish and sustain the fisheries of the entire eastern coast.
- These mangroves dominate the fringing areas along the creeks and backwaters, and grow along the sides of rivers in muddy as well as in flat, sandy areas.

Conservation:

- **UNESCO: Four protected areas in the Sundarbans are enlisted as UNESCO World Heritage Sites, viz.**
- **Sundarbans National Park (India), Sundarbans West (Bangladesh), Sundarbans South (Bangladesh) and Sundarbans East (Bangladesh).**

- **Ramsar Site: It is a 'Wetland of International Importance' under the Ramsar Convention.**

15. Venezuela

Context:

Venezuela is thought to be the first nation in modern times to have completely lost all of its glaciers.

About Venezuela:

- It is located on the northern coast of South America.
- **Boundaries: It is bounded by the Caribbean Sea and the Atlantic Ocean to the north, Guyana to the east, Brazil to the south, and Colombia to the southwest and west.**
- **Capital: Caracas**
- A physiographically diverse country, Venezuela incorporates the northern Andean Mountain chains and interior highlands, the main portions of the Orinoco River basin with its expansive Llanos (plains), Lake Maracaibo, which is the largest lake in South America, and the spectacular Angel Falls, the world's highest waterfall.

Major Rivers:

- **Rio Negro** (shared with Colombia and Brazil): 2,250 km. It is a major tributary of the Amazon River.
- **Orinoco** (shared with Colombia): 2,101 km. It is the third-longest river in South America, after the Parana and the Amazon.

Venezuela administers a number of Caribbean islands and archipelagos, among which are Margarita Island, La Blanquilla, La Tortuga, Los Roques, and Los Monjes. Resources: Venezuela is home to the world's largest oil reserves as well as huge quantities of coal, iron ore, bauxite, and gold.



16. Deda Method

Context:

Muria tribal farmer, who migrated from Chhattisgarh and settled in the dense forests of the Godavari Valley, is practising 'deda' method.

About Deda Method:

- **It is a method of preserving seeds that his ancestors handed over to his family.**

How do they preserve?

- **The seeds are preserved in leaves and packed almost airtight to look like boulders from a distance.**
- The packaged seeds are, in turn, woven with Siali leaf (*Bauhinia vahlii*), which is locally known as 'addakulu' to make the deda.
- **A deda has three layers. In the first layer, wood ash is spread inside the Siali leaves.**
- Later, the ash is covered with lemon leaves to form a casing, and, lastly, the seeds are preserved inside the casing and sealed. Each deda is crafted to support at least 5kg of seeds.

Advantages:

- The deda method guarantees protection of seed from pests and worms.
- In this method, the stored seeds can be used for cultivation for up to five years.
- It helps in preserving the seeds of pulses like the green gram, red gram, black gram and beans.

17. World Wildlife Crime Report 2024**Context:**

The United Nations Office on Drugs and Crime has released the World Wildlife Crime Report 2024.

Key Findings:

- **The market for rhino horn (29 percent) constituted the biggest chunk among animal species.**
- It was followed by the market for pangolin scales at 28 percent, followed by the market for elephant ivory at 15 percent.
- Other animal species most affected by the global illegal animal trade included eels (5 percent), crocodilians (5 percent), parrots and cockatoos (2 percent), carnivores (2 percent), turtles and tortoises (2 percent), snakes (2 percent), seahorses (2 percent) and others (8 percent).
- The rhino and the cedar were the animal and plant species most affected by global illegal wildlife trade during 2015-2021.

International Conventions to tackle wildlife crimes:

- **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES):** Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species.
- international organization working in the field of nature conservation and sustainable use of natural resources.

- **Convention on the Conservation of Migratory Species of Wild Animals (CMS):** It is an international agreement that aims to conserve migratory species throughout their ranges.

18. Heat Wave**Context:**

IMD announced the onset of monsoon over the south Andaman Sea and the Nicobar Islands, while it also warned of a 'heat wave to severe heat wave' over northwest India.

About:

- A red warning implies that local agencies need to take action to prevent extreme heat-related emergencies.
- A Heat Wave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season in the North-Western parts of India.
- Heat Waves typically occur between March and June, and in some rare cases even extend till July.
- **Heat wave is considered if the maximum temperature of a station reaches at least 40°C or more for Plains and at least 30°C or more for Hilly regions.**

Based on Departure from Normal:

- **Heat Wave: Departure from normal is 4.5°C to 6.4°C.**
- **Severe Heat Wave: Departure from normal is >6.4°C. .**

Based on Actual Maximum Temperature:

Heat Wave: When actual maximum temperature $\geq 45^{\circ}\text{C}$.

- **Severe Heat Wave: When actual maximum temperature $\geq 47^{\circ}\text{C}$.**

The health impacts of Heat Waves typically involve dehydration, heat cramps, heat exhaustion and/or heat stroke.

19. Critical Tiger Habitat

Context:

Recently, the Supreme Court has ordered the Rajasthan government to shutter 68 mines operating within a 1-kilometre periphery of the critical tiger habitat (CTH) of the Sariska reserve.

About Critical Tiger Habitat:

- **It is also known as core areas of tiger reserves— are identified under the Wild Life Protection Act (WLPA), 1972.**
- These are based on scientific evidence that "such areas are required to be kept as inviolate for the purpose of tiger conservation, without affecting the rights of the Scheduled Tribes or such other forest dwellers".
- **The notification of CTH is done by the state government in consultation with the expert committee constituted for the purpose.**

Key facts about Sariska Tiger Reserve:

- It is located in the Alwar district of Rajasthan. It is well nestled in the Aravali Hills.
- It is the first reserve in the world to successfully relocate tigers.
- It is also famous for old temples, palaces, and lakes such as Pandu Pol, Bhangarh Fort, Ajabgarh, Pratapgarh, Siliserh Lake, and Jai Samand Lake.
- **Topography:** It possesses a rocky landscape, scrub thorn arid forests, grasses, hilly cliffs, and semi deciduous wood.
- **Vegetation:** The vegetation of Sariska corresponds to Northern Tropical Dry Deciduous Forests and Northern Tropical Thorn Forest.
- **Flora:** Dhok trees, salar, kadaya, gol, ber, Banyan, gugal, bamboo, kair, adusta, etc.
- **Fauna:** A variety of other wild animals, like the leopard, sambhar, chital and nilgai etc.

20. GloLitter Partnership

Context:

In Andhra-Odisha coast, ghost gear poses a serious threat to marine life.

GloLitter Partnership:

- It is a project that aims to reduce marine litter.
- Objectives – To support developing countries in identifying opportunities for the prevention and reduction of marine litter.
- Total Budget – Approximately \$5 Million.
- **Partnership – Government of Norway, International Maritime Organisation (IMO) & Food and Agriculture Organization (FAO).**
- **Focus** – It works in 5 key regions, with a total of 30 countries engaged as either Lead Partner Countries (LPCs) or Partner Countries (PCs).
- **Services** – Equip partner countries with knowledge and tools to address the problems of marine plastic litter.
- Establish public-private partnerships to demonstrate best marine plastic litter management solutions.
- Engage women in tackling marine plastic litter problems and facilitate regional and global partnerships between countries and organizations to have a greater impact.
- **Impact** – Marine plastic litter originating from the shipping and fisheries sectors is prevented and reduced.

Ghost gear:

- It is any fishing equipment that has been lost, discarded or abandoned in water bodies.
- It comprised largely of gill net, nylon and polypropylene rope.

21. Dissociative Recombination Reaction**Context:**

A new study in the journal Nature suggests that Venus lost all its water due to a runaway greenhouse effect caused by a chemical reaction called HCO⁺ dissociative recombination reaction (DR).

About

- On Venus, the HCO⁺ dissociative recombination reaction (DR) occurs in bulk at an altitude of about 125 km, above the clouds made of sulphuric acid.
- Creation of HCO⁺: It is created when a carbon monoxide molecule (CO) loses an electron while absorbing a hydrogen atom.
- DR is the reverse reaction: HCO⁺ absorbs an electron and breaks up into CO and a hydrogen atom. These energetic hydrogen atoms then escape into space.
- And without hydrogen, there can't be water (H₂O).

Venus

- Venus is the second planet from the Sun, and the sixth largest planet. It's the hottest planet in our solar system.
- Its surface temperature is nearly 900 degrees Fahrenheit.
- Composition: Venus is made up of a central iron core and a rocky mantle, similar in composition to Earth.
- Atmosphere: Venus' atmosphere is made up of mainly carbon dioxide (96%) and nitrogen (3.5%) with trace amounts of carbon monoxide, sulfur dioxide, water vapor, argon, and helium making up the other 0.5%.



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- Future Missions: EnVision orbiter (European space agency), DAVINCI and VERITAS missions (NASA), Shukrayaan (ISRO).

22. World Water Forum**Context:**

The World Bank has released the Water for Shared Prosperity report at the 10th World Water Forum in Bali, Indonesia.

About:

- It highlights the global inequalities in water access and recommends pro-poor and inclusive interventions to improve water security and boosting shared prosperity.
- The report emphasises the widening gap in access to water resources and services, with implications for human and economic development worldwide.

World Water Forum:

- The World Water Forum is organized every three years between the World Water Council and a host country.
- The Forum provides a unique platform where the water community and key decision makers can collaborate and make long-term progress on global water challenges.
- The Forum brings together participants from all levels and areas, including politics, multilateral institutions, academia, civil society and the private sector, among others.

23. GSAP SKILLS Platform**Context:**

Recently, the GSAP SKILLS Platform was launched at the Fourth meeting of the

Subsidiary Body on Implementation, Convention on Biological Diversity.

About GSAP SKILLS Platform:

- Global Species Action Plan (GSAP), the Species Conservation Knowledge, Information, Learning, Leverage and Sharing (SKILLS) platform brings the GSAP's content online and allows the updating of

- It aims to facilitate global collaboration and partnership, connecting decision makers, species conservation practitioners and experts at all levels.
- The platform provides real-time updates on technical tools and resources, ensuring accessibility and relevance.
- Each Global Biodiversity Framework target is accompanied by a brief summary and rationale for species conservation interventions, actions, and sub-actions, actors and technical tools and resources for those actions, facilitating the scaling-up of implementation efforts.
- This platform is managed proactively by IUCN to meet the needs from governments and all stakeholders to take actions for species.
- The development of the GSAP SKILLS platform has been principally supported by Ministry of Environment, Republic of Korea, with additional resources from the Tech4Nature Initiative launched by IUCN and Huawei in 2020.

What is the Global Species Action Plan?

- It has been developed to support implementation of the KunmingMontreal Global Biodiversity

Framework (GBF) and to address the increasing biodiversity loss worldwide.

- It outlines strategic interventions and actions to conserve and sustainably manage species while ensuring equitable benefits

24. Important Lakes

Context:

A new study has shed light on the extent of microplastic pollution in Ashtamudi Lake, underscoring the need for continuous monitoring and addressing “potential public health concerns.”

<i>Lakes</i>	<i>Located in</i>
1. <i>Cumbum Lake</i>	<i>Andhra Pradesh</i>
2. <i>Ganga Lake</i>	<i>Arunachal Pradesh</i>
3. <i>Ulsoor lake</i>	<i>Karnataka</i>
4. <i>Ashtamudi Lake</i>	<i>Kerala</i>

About Ashtamudi Lake: It is a Ramsar wetland located in Kollam district of Kerala.

- This lake is known for its panoramic beauty and eight channels that connect to one lake. It is because of its eight 'arms' or channels, that the lake is named Ashtamudi.
- It is the second largest lake in Kerala, which has found its way into the sea through the Neendakara estuary.
- Kallada river is the major source of water for Ashtamudi lake.
- The historical significance of Ashtamudi lake dates back to the 14th century when the lake surroundings were the important port connecting the ancient city of Quilon to the rest of the world.
- Historical records of the Moroccan explorer Ibn Battuta highlights Quilon city, in the banks of Ashtamudi lake as one of the major trading centers in the ancient period.
- Different species of marshy mangroves was reported in the region, including two endangered species called *Syzygium travancoricum* and *Calamus rotang*.

25. Naming of Cyclones

Context:

According to Indian Meteorological Department (IMD), Cyclone Remal will likely make landfall between West Bengal's Sagar Island and Bangladesh's Khepupara. Cyclone Remal, the 1st pre-monsoon tropical cyclone in the Bay of Bengal in 2024, whose name means 'sand' in

Naming of Cyclones:

- PTC – Panel of Tropical Cyclones, established in 1972 by World Meteorological Organisation for naming tropical cyclones.
- 13 member countries – Bangladesh, India, Maldives, Myanmar, Pakistan, Sri Lanka, Oman & Thailand were the 8 original members
- In 2018, Iran, Qatar, Saudi Arabia, UAE and Yemen were included.
- Assigning name – In 2000, PTC agreed to assign names, each member to send its recommendations and finalised by PTC.
- Coverage – The tropical cyclones in Bay of Bengal and Arabian Sea.
- The Panel of Tropical Cyclones (PTC) of started naming cyclones in the region in 2004.
- Name list – In 2020, a list of 169 cyclone names were released, comprises 13 suggestions each from the 13 countries.
- The countries are arranged in alphabetical order, all the names suggested by them are placed alongside in different columns with 1 name in each, totally 13 columns.

Guidelines in naming Cyclone – The proposed name

- Is neutral to (a) politics and political figures (b) religious believes, (c) cultures and (d) gender;
- Does not hurt the sentiments of any group of population over the globe or is not very rude and cruel in nature;
- Is short, easy to pronounce, and not offensive to any PTC member;
- Is at most 8 letters long;
- Is provided with its pronunciation and voice over; and
- Is not repeated (not before, not after).

Cyclone Name List (169 names)

Countries	Column 1 - Used	Column 2 – Used till Ramal
Bangladesh	Nisarga	Biparjoy
India	Gati	Tej
Iran	Nivar	Hamoon
Maldives	Burevi	Midhili
Myanmar	Tauktae	Michaung
Oman	Yaas	Remal
Pakistan	Gulab	Asna
Qatar	Shaheen	Dana
Saudi Arabia	Jawad	Fengal
Sri Lanka	Asani	Shakhti
Thailand	Sitrang	Montha
UAE	Mandous	Senyar
Yemen	Mocha	Ditwah

- Name allocation – The name in the 1st column is chosen
- For instance, the 1st cyclone was named Nisarga (by Bangladesh that hit Maharashtra, followed by Gati (India's choice, hit Somalia), Nivar (Iran's choice, hit Tamil Nadu).
- After all the names of 1st column are exhausted, names from the next column are chosen, again starting from Bangladesh (for instance, after Mocha, the next cyclone was named Biparjoy).
- New list – After this current list is exhausted, a new list will be submitted by PTC members.
- Significance of naming – It is easy to identify individual cyclones, create awareness of its development, rapidly disseminate warnings for disaster mitigation and management.

26. Minor Forest Produce**Context:**

The indigenous communities of Odisha are eagerly waiting for the forest department's approval to sell Kendu leaves.

About Minor Forest Produce

The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (aka Forest Rights Act, 2006), defines 'minor forest produce' as any non-timber forest product of plant origin. It includes various items such as bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, Kendu leaves, medicinal plants, herbs, roots, tubers and similar items.

- **Tendu Leaves:** Used for making beedis (hand-rolled cigarettes).
- **Bamboo:** Used for construction, handicrafts, and various household items.
- **Honey:** Collected from natural beehives.
- **Herbs and Medicinal Plants:** Used for traditional medicine and Ayurvedic practices.

In simple terms, it encompasses all other forest products, excluding timber.

Forest Rights Act (2006) aims to empower local communities by recognizing their traditional rights over these valuable resources.

Kendu Leaf (Tendu Leaf or Diospyros Melanoxylon)

- It is a nationalised product like Bamboo and Sal seed, and one of the most important non-wood forest products of Odisha. ○ Due to its unique characteristics, viz. Matching aroma with Tobacco, Hygroscopic nature of dry leaves to withstand crack, Thinness and pliability, gradual combustion, resistance to fungus attack etc. these valuable leaves are used for wrapping Bidis.
- The leaves are rich in tannins and have been a significant source of livelihood for forest-dwelling communities.
- The forest department of Odisha procures Kendu leaves from local communities through its Kendu Leaf (KL) wing and then sells them to contractors via tenders.
- Odisha is the third largest producer of Kendu Leaf next to Madhya Pradesh and Chhattisgarh.

27. Global Red List of Mangrove Ecosystems

Context:

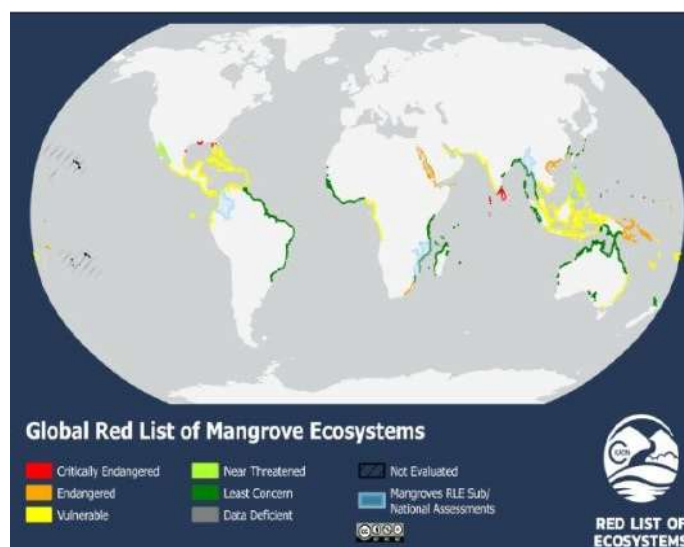
A new study warns that South India's mangrove ecosystems under risk of collapse.

Global Red List of Mangrove Ecosystems:

📄 Published by – IUCN

- Data source – IUCN's Red List of Ecosystems.
- Prepared by – Experts from various research institutions, including the IUCN Species Survival Commission and the Global Mangrove Alliance.

- Coverage – World's mangrove ecosystems in 36 different regions.
- **Findings** – The world's mangrove ecosystems cover about 150 thousand sq.km along mainly tropical, subtropical and some warm temperate coasts of the world.
- About 15% of the world's coastlines are covered by mangroves.
- 50% of the mangrove ecosystems assessed are at risk of collapse under vulnerable, endangered, or critically endangered category.
- Nearly 20% are at high risk, classed as either endangered or critically endangered
- World's top 2 mangrove ecosystems 'Warm Temp North West Atlantic' and 'South India and Sri Lanka, and Maldives' are in the critically endangered category.
- 5 regions in the endangered and 10 in the vulnerable categories.
- **In India** – They are in high risk of collapse in South India due to Pollution, deforestation and development activities at the coast.
- However, mangrove ecosystems in western and eastern India are less susceptible to risk.



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28. Marine Protected Areas (MPAs)

Context:

A new study found that 62% of Marine Protected Areas (MPAs) aimed at protecting rare migratory fish species called diadromous fish fall outside their core habitats.

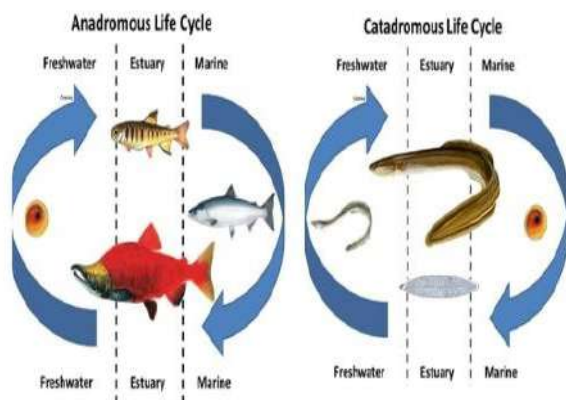
About:

- Diadromous fish migrate between saltwater and freshwater environments during their lifecycles.
- Diadromous fish are a species group that includes both anadromous and catadromous fish.

The anadromous species – They spawn in fresh water but spend much of their lives in the sea.

The catadromous species – They spawn at sea but spend most of their lives in freshwater.

o Spawns are the eggs and sperm released by fishes and other aquatic animals. The female fish releases eggs into the water & the male fish releases milt (semen from male fish) to fertilize the eggs.



- Only 55% of the modelled core habitats for 11 rare diadromous fish species overlapped with existing MPAs.
- Of the MPAs that did overlap core habitats, only half had actual protection measures implemented for these fish.
- Species like the endangered Mediterranean twaite shad had less than 30% of their core habitat covered by MPAs.

- The study highlights that MPAs are often designated without data on the habitats of rare, threatened species they aim to conserve.
- A new modelling approach called 'Combined Model for Accurate Prediction' can help identify core areas to better target conservation efforts.
- Climate change is causing shifts in migration patterns and timing for diadromous fish, impacting their survival.

29. Kavango-Zambezi (KAZA) Trans-Frontier Conservation Area (TFCA) summit

Context:

More than 400 delegates are gathered in Livingstone, a Zambian resort town on the northern side of the Victoria Falls, for the inaugural Kavango-Zambezi (KAZA) Trans-Frontier Conservation Area (TFCA) summit. About KAZA:

- The KAZA region is a 520,000-square kilometre wetland paradise straddling these five southern African nations that have common international borders along the

Okavango and Zambezi River basins

- It is home to a high concentration of wildlife species, including the largest elephant population.
- About 70 per cent of KAZA land is under conservation, made up of 103 wildlife management areas and 85 forest reserves.
- Within it are also three World Heritage sites namely the Victoria Falls on the Zambezi River which makes the border between Zambia and Zimbabwe and the Okavango Delta and the Tsodilo Hills both in Botswana.
- The KAZA states signed a Memorandum of Understanding in 2006 resulting in the KAZA Treaty of 2011 followed by its immediate implementation.
- The KAZA-FTCA area is a partnership centred around "a common vision to conserve biodiversity at scale through promoting integrated transboundary management and to market the landscape biodiversity using naturebased tourism as the engine for rural economic growth and development."

30. EarthCARE Mission

Context:

Recently the EarthCARE Mission was launched to measure the influence of clouds on the climate.

About:

- EarthCARE (Cloud, Aerosol and Radiation Explorer) mission will advance the understanding of the role that clouds and aerosols play in reflecting incident solar radiation back into space and trapping infrared radiation emitted from Earth's surface.
- It is a joint venture between ESA (European Space Agency) and JAXA (Japan Aerospace Exploration Agency).

EarthCARE Instruments:

- The Atmospheric Lidar (ATLID) provides vertical profiles of aerosols and thin clouds. It operates at a wavelength of 355 nm.
- The Cloud Profiling Radar (CPR) provides vertical profile measurements of clouds and observes vertical velocities of cloud particles through Doppler measurements. It operates at 94GHz.
- The Multi-Spectral Imager (MSI) hosted by EarthCARE provides across-track information on clouds and aerosols with channels in the visible, near infrared, shortwave and thermal infrared.
- The Broad-Band Radiometer (BBR) provides measurements of top-of-the-atmosphere radiances and fluxes.



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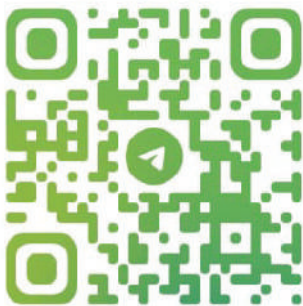
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7	CA October 2024	17-11-2024
8	CA November 2024	15-12-2024
9	CA December 2024	12-01-2025
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SCIENCE & TECHNOLOGY

1. Expanded Programme on Immunization

Context:

The year 2024 commemorates 50 years of the Expanded Programme on Immunization (EPI).

About

- **It was launched as the Expanded Programme on Immunization (EPI) by World Health Organisation in 1974 to ensure that all children, in all countries, benefited from life-saving vaccines.**
- This programme has evolved into what is now commonly known as the Essential Programme on Immunization.

Disease covered (Total 13)

- **Initially this programme focused on protection against six childhood vaccine-preventable diseases** namely Bacillus Calmette-Guérin (BCG), diphtheria, pertussis, tetanus, polio, and measles.
- **Later on, WHO added 7 more disease under this initiative** Haemophilus influenzae type B (Hib), Hepatitis B (HepB), rubella, pneumococcal disease (PNC), rotavirus (Rota), human papillomavirus (HPV), and COVID-19 (for adults).

India's Universal Immunization Programme (UIP)

- India launched the EPI in 1978, which was later renamed as the Universal Immunization Programme (UIP) in 1985.

Objectives:

- To rapidly increase immunization coverage.
- To improve the quality of services.
- To establish a reliable cold chain system to the health facility level.
- Monitoring of performance.
- To achieve self-sufficiency in vaccine production.

Eligibility:

- All beneficiaries' namely pregnant women and children can get themselves vaccinated at the nearest Government/Private health facility or at an immunization session site (Anganwadi centres/ other identified sites) near to their village/urban locality on fixed days.
- The UIP covers all sections of the society across the country with the same high-quality vaccines.

Under UIP, immunization is providing free of cost against 12 vaccine preventable diseases

Nationally against 9 diseases - Diphtheria, Pertussis, Tetanus, Polio, Measles, Rubella, severe form of Childhood Tuberculosis, Hepatitis B and Meningitis & Pneumonia caused by Hemophilus Influenza type B

Sub-nationally against 3 diseases - Rotavirus diarrhoea, Pneumococcal Pneumonia and Japanese Encephalitis; of which Rotavirus vaccine and Pneumococcal Conjugate vaccine are in process of expansion while JE vaccine is provided only in endemic districts.

2. Antares

Context:

The Bengaluru-based Indian Institute of Astrophysics (IIA) has filmed the passing of the moon in front of Antares, a bright red star.

About Antares:

- **Antares, also known as Alpha Scorpii, is the alpha, or brightest, star in the constellation Scorpius, and the 15th-brightest star in the whole night sky.**
- It is a massive red supergiant star.
- It is 10,000 times brighter than our sun.
- It is one of the largest known stars, 700 times the sun's diameter, large enough to engulf the orbit of Mars if the solar system were centered on it.
- It lies about 600 light-years from the Earth.
- Despite its size, the overall density of Antares

What is a Red Supergiant Star?

- They are very large stars that are approaching the later stages of their stellar life.
- They have a radius that is several hundred to 1500 times that of the Sun.
- Though they are great in size, the red colour indicates that stars of this type have a relatively low surface temperature.
- They are highly luminous.
- Most red supergiants are variable stars. This means, their degree of brightness changes and fluctuates as seen on Earth.
- Also, these stars are actively losing mass. Nebulae have been seen around them as they expel material.

3. Geographical Indication

Context:

Recently, the Controller General of Patents, Designs, and Trademarks (CGPDTM) has bestowed the Geographical Indication (GI) certificate upon the traditional artisans of 'Kutch Ajrakh,' hailing from the vibrant region of Kutch in Gujarat.

Traditional Textile Fabric	Associated State
1. <i>Ajrakh textile craft</i>	<i>Gujarat</i>
2. <i>Kunbi weaves</i>	<i>Goa</i>
3. <i>Himroo</i>	<i>Maharashtra</i>
4. <i>GaradKorial</i>	<i>West Bengal</i>

About Kutch Ajrakh

- **The Ajrakh is a textile craft, and holds deep roots in the cultural tapestry of Gujarat,** particularly in the regions of Sindh, Barmer, and Kutch, where its legacy spans millennia.
- The art of Ajrakh entails a meticulous process of hand-block printing on treated cotton cloth, culminating in intricate designs infused with rich symbolism and history.
- This craft was introduced to this region over 400 years back by the Sind Muslims.
- Nomadic pastoralist and agricultural communities like the Rabaris, Maldharis, and Ahirs wear Ajrakh printed cloth as turbans, lungis, or stoles.

Kunbi weaves from Goa A type of dyed sari.

- It is a chequered saree prominently dyed in red and its variants.

Himroo from Maharashtra

- Himroo is a fabric produced in Aurangabad from locally grown silk and cotton.
- Himroo is a replica of Kum-Khwab, which was made for the royal families in ancient times from strands of gold and silver.

4. Eta Aquariid meteor shower

Context:

The Eta Aquariid meteor shower, which has been active since April 15, will peak on May 5 and 6.

About Eta Aquariid meteor shower:

- Eta Aquariid meteors are known for their speed, with the meteors travelling at about 148,000 mph (66 km/s) into Earth's atmosphere.
- Fast meteors can leave glowing "trains" (incandescent bits of debris in the wake of the meteor) which last for several seconds to minutes.
- The Eta Aquariid meteor shower is formed when Earth passes through the orbital plane of the famous Halley's Comet.

- The Eta Aquariid peak during early May each year.
- The Eta Aquariid is viewable in both the Northern and Southern hemispheres during the pre-dawn hours.
- The Southern Hemisphere is preferable for viewing the Eta Aquariids.
- The Northern Hemisphere has an hourly rate of only about 10 meteors.
- This is due to the viewing location of the radiant from different latitudes.

Where Do Meteors Come From?

- Meteors come from leftover comet particles and bits from broken asteroids.
- When comets come around the Sun, they leave a dusty trail behind them. A meteor shower can be observed when Earth passes through the clouds of dust left behind in a comet's orbital plane.
- The sky lights up with small and large meteor tails as the debris left behind by the comet interacts with Earth's atmosphere.

5. Endosymbiotic Theory

Context:

Two papers published recently have generated new interest in the endosymbiotic theory. About Endosymbiotic Theory:

- The endosymbiotic theory states that some of the organelles in today's eukaryotic cells were once prokaryotic microbes.
- In this theory, the first eukaryotic cell was probably an amoeba-like cell that got nutrients by phagocytosis and contained a nucleus that formed when a piece of the cytoplasmic membrane pinched off around the chromosomes.
- Some of these amoeba-like organisms ingested prokaryotic cells that then survived within the organism and developed a symbiotic relationship.
- Mitochondria formed when bacteria capable of aerobic respiration were ingested; chloroplasts formed when photosynthetic bacteria were ingested. They eventually lost their cell wall and much of their DNA because they were not of benefit within the host cell.
- The endosymbiotic theory describes how a large host cell and ingested bacteria could easily become dependent on one another for survival, resulting in a

- Over millions of years of evolution, mitochondria and chloroplasts have become more specialized, and today they cannot live outside the cell.

Prokaryotes vs. Eukaryotes

- All living things can be divided into three basic domains: Bacteria, Archaea, and Eukarya.
- The primarily single-celled organisms found in the Bacteria and Archaea domains are known as prokaryotes. These organisms are made of prokaryotic cells—the smallest, simplest, and most ancient cells.
- Organisms in the Eukarya domain is made of more complex eukaryotic cells. These organisms, called eukaryotes, can be unicellular or multicellular and include animals, plants, fungi, and protists.
- The biggest distinction between them is that eukaryotic cells have a distinct nucleus containing the cell's genetic material, while prokaryotic cells don't have a nucleus and have free-floating genetic material instead.
- Eukaryotes developed at least 2.7 billion years ago, following 1 to 1.5 billion years of prokaryotic evolution.
- Eukaryotic cells have several other membrane-bound organelles not found in prokaryotic cells. These include the mitochondria, rough and smooth endoplasmic reticulum, golgi complex, and in the case of plant cells, chloroplasts (conduct photosynthesis).

Although prokaryotic and eukaryotic cells have many differences, they share some common features, including the following:

- DNA.
- Cell (or plasma) membrane
- Cytoplasm: Jelly-like fluid within a cell that is composed primarily of water, salts, and proteins.
- Ribosomes: Organelles that make proteins.



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6. Air Independent Propulsion

Context:

A massive Rs 60,000 crore contract to modernize the Indian Navy submarine fleet to build six stealth submarines equipped with Air Independent Propulsion (AIP) technology has started with trials of competing teams at Mazagaon Docks, Mumbai.

What is AIP?

- With the emergence of submarines, there was a problem finding satisfactory forms of propulsion underwater.
- Traditional diesel-electric submarines need to surface frequently to charge their batteries and have an underwater endurance of only a few days.
- As battery technology improved, the endurance of these submarines increased proportionally. But it was not enough to last them beyond a week.
- **In 1908, the Imperial Russian Navy launched the submarine Pochtovy, which used a gasoline engine fed with compressed air and exhausted underwater.**
- **These two approaches, the use of a fuel that provides energy to an open-cycle system, and the provision of oxygen to an aerobic engine in a closed cycle, characterise AIP today.**
- Most of these systems generate electricity, which, in turn drives an electric motor for propulsion or recharges the boat's batteries.
- The introduction of AIP vastly improved the underwater endurance of these submarines and gave them a distinct advantage.
- **AIP is mostly implemented as an auxiliary source, with the traditional diesel engine handling surface propulsion.**
- AIP technology can be installed on existing, older-generation submarines by inserting a new hull section during a retrofit.
- A typical conventional power plant provides 3 megawatts maximum, and an AIP source around 10 percent of that. A nuclear submarine's propulsion plant is much greater than 20 megawatts.

Advantages of AIP system:

- **It allows the submarines to stay for longer hours in the water.**
- **It decreases the noise levels made by the submarines. This makes it hard to detect the submarines.**

Types of AIP: Open-cycle systems, Closedcycle diesel engines, Closed-cycle steam turbines Stirling cycle engines and Fuel cells.

The Defence Research and Development Organisation (DRDO) is using the fuel cells-based AIP System. It is unique as hydrogen is generated onboard. The plant was operated in endurance mode and max power mode as per the user requirements. The system is being developed by the Naval Materials Research Laboratory (NMRL) of DRDO.

Countries that use AIP:

- Germany – Fuel Cell
- Sweden – Stirling ☐ Japan – Stirling
- France – MESMA
- Spain – Fuel Cell
- India – Fuel Cell
- Russia – Fuel Cell
- People's Republic of China – Stirling

7. FWD-200B

Context:

India's first indigenous bomber UAV aircraft, the FWD-200B, developed by Flying Wedge Defence, an Indian defence and aerospace company, was unveiled recently.

About FWD-200B:

- **It is an indigenous military grade bomber unmanned aerial vehicle (UAV).**
- **It is India's first indigenous unmanned bomber aircraft.**
- It is designed and manufactured by Flying Wedge Defence and Aerospace Technologies, an Indian defence and aerospace company.
- It has a payload capacity of 100 kg and is classified as a MALE (medium-altitude, long-endurance) Unmanned Combat Aerial Vehicle.

- The Unmanned Aerial System (UAS) consists of optical surveillance payloads and is integrated with missile-like weapons for precision air strikes.
- It has a maximum speed of 370 kmph (200 knots), an endurance capacity of 12 to 20 hours, and a ground control station range of 200 km.
- At six metres long, with an eight-metre wingspan, the aircraft can carry a maximum take-off weight of 498 kg and has an operational altitude of 9,000 feet above mean sea level.

8. Magnetic Resonance Imaging

Context:

For those trying to look inside the human body without surgery, magnetic resonance imaging is an indispensable tool. About Magnetic Resonance Imaging:

- It is used to obtain images of soft tissues within the body. Soft tissue is any tissue that hasn't become harder through calcification.
- It is a non-invasive diagnostic procedure widely used to image the brain, the cardiovascular system, the spinal cord and joints, various muscles, the liver, arteries, etc.
- Its use is particularly important in the observation and treatment of certain cancers, including prostate and rectal cancer, and to track neurological conditions including Alzheimer's, dementia, epilepsy, and stroke.
- The MRI technique's use of strong magnetic fields, individuals with embedded metallic objects (like shrapnel) and metallic implants, including pacemakers, may not be able to undergo MRI scans.

Working:

- An MRI procedure reveals an image of a body part using the hydrogen atoms in that part.
- It uses the body's natural magnetic properties to produce detailed images from any part of the body. For imaging purposes, the hydrogen nucleus (a single proton) is used because of its abundance in water and fat.

- The machine includes a superconducting magnet creating a stable magnetic field, aligning hydrogen atom spins. A radiofrequency pulse is emitted, exciting excess atoms.
- When the pulse stops, these atoms emit energy, detected and converted into signals by a receiver. These signals are processed by a computer to generate detailed 2D or 3D images of the scanned body part

9. Spektr-RG(SRG)

Context:

Astronomers report the discovery of a new pulsar using the Spektr-RG space observatory.

About Spektr-RG(SRG):

- Spektr-Rentgen-Gamma (Spektr-RG, SRG) is a German-Russian highenergy astrophysics space observatory to study the universe in the X-ray range of electromagnetic radiation.
- It was launched on July 13, 2019, on a Proton-M rocket from the cosmo drome in Baikonur, Kazakhstan.
- It moves along a so-called halo orbit around the outer Lagrange point (L2) of the Sun-Earth system at a distance of 1.5 million km from the Earth with a period of about 6 months.
- A Lagrange point is a position in space where the gravitational pull of two large masses precisely equals the centripetal force required for a small object to move with them.

Instruments:

- The primary instrument of the mission is eROSITA, built by the Max Planck Institute for Extraterrestrial Physics (MPE) in Germany.
- It is designed to conduct a seven-year X-ray survey, the first in the medium X-ray band less than 10 keV energies, and the first to map an estimated 100,000 galaxy clusters.

- This survey may detect new clusters of galaxies and active galactic nuclei.
- The second instrument, ART-XC, is a Russian high-energy X-ray telescope capable of detecting supermassive black holes.
- It is intended to replace the Spektr-R, known as the "Russian Hubble". Spektr-R was launched in 2011 to observe black holes, neutron stars, and magnetic fields, aiding understanding of cosmic expansion.

10. Electric Propulsion System

Context:

Electric Propulsion System for Warships India and the UK government are discussing the possibility of an agreement to develop an electric propulsion system in India to power domestic warships.

- **Indian warships are currently powered by diesel engines, gas turbines or steam turbines.**
- The electric propulsion capability is meant to power larger warships with a displacement of over 6,000 tonnes.
- The India and the UK government are discussing the possibility of an agreement to develop an electric propulsion system in India.
- The pact to be signed between India and UK will also cover aspects such as training, equipment and infrastructure.
- Both countries have set up a joint electronic propulsion working group that met in the UK in February.
- Once the agreement is signed, the key capability will be developed through a collaboration between the UK's GE Power Conversion and state-owned Bharat Heavy Electricals Ltd (BHEL) from India.
- Both companies have signed a memorandum of understanding on developing the 'Integrated Full Electric Propulsion System'.
- The UK Royal Navy's The Queen Elizabeth Class aircraft carriers are integrated full electric propulsion vessels.

- In India, the system will first be tested on landing platform docks and next-generation destroyers.

11. Glide Phase Interceptor (GPI) Project

Context:

Amid growing concerns over rivals deploying advanced weapons like hypersonic missiles, Japan is investing in the Glide Phase Interceptor (GPI) Project under joint development with the US. About Glide Phase Interceptor (GPI) Project:

- **It is a missile-intercepting system under joint development by the US and Japan.**
- By the end of 2032, Washington and Tokyo aim to achieve full operational capability for the system.

What is the Glide Phase?

- With a traditional Intercontinental Ballistic Missile (ICBM), the warhead separates from its booster and continues on a parabolic, gravity driven trajectory to its target.
- A hypersonic weapon, by contrast, separates from its booster after the peak of its trajectory and accelerates toward the Earth using gravity. It then performs a pitch manoeuvre to begin a flatter trajectory called the glide phase.
- Unlike typical ballistic missiles, the hypersonic and glide vehicles travel at five times (or more) the speed of sound on an unpredictable trajectory.

What is the Project all about?

- Hypersonic weapons or missiles pose a unique challenge due to their blinding speeds and relatively low altitudes (20 to 80 km) during the glide phase.
- They can navigate around areas containing known missile defence sensors.
- These characteristics make it particularly challenging for groundbased radar systems to track them efficiently.

- The GPI Project aims to provide regional hypersonic missile defence.
- It will achieve this by launching specially modified missiles from surface warships.
- These missiles will engage and destroy incoming hypersonic missiles as they glide through the boundary between space and Earth's atmosphere.
- The "glide" phase of the missile's trajectory provides the best opportunity to intercept it before it enters its last high-speed drop.

12. Widal Test

Context:

The Widal Test's propensity for erroneous results is obfuscating India's typhoid burden, increasing expenses, and risking more antimicrobial resistance.

About Widal Test:

- It is a test done for diagnosing typhoid fever.
- Typhoid fever, also known as enteric fever, is a bacterial infection caused by the bacterium *Salmonella Typhi*, and it is commonly spread through contaminated food or water.
- A person with typhoid fever will experience symptoms like fatigue, high fever, headache, diarrhoea or constipation, abdominal pain, weight loss, and red spots.
- These symptoms mimic those of malaria, dengue, influenza, and typhus, to name a few, making it difficult to diagnose without proper testing.
- As with other infections, our immune system produces antibodies in the blood against the bacteria, causing enteric fever.
- The widal test is a serological test that detects antibodies against the bacteria in a patient's blood sample, indicating whether or not they have been infected with the bacteria.
- It is used to help diagnose a current or recent infection or to determine if an individual has had a previous typhoid infection.

- It's a point-of-care test and doesn't need special skills or infrastructure. Developed in the late 1800s by a French physician, it is no longer used in many countries because of its flaws. The World Health Organization (WHO) has said that due to the various factors that can influence the results of a Widal test, it is best not to rely too much on this test.

Limitations:

- A single positive Widal test report doesn't necessarily mean a typhoid infection is present, and a negative report doesn't confirm the disease's absence.
- To diagnose an active infection, clinicians must test at least two serum samples taken at least 7-14 days apart, so that they may detect a change in the concentrations of the antibodies. But getting two samples is rarely feasible and time consuming.
- In areas with a high and continuous typhoid burden, certain levels of antibodies against the bacteria may already be present in the blood. Without knowing the baseline cut-off, it isn't possible to correctly interpret the test.
- The reagents used in the Widal test to reveal the presence of various antibodies can cross-react with antibodies produced against infections by other bacteria, viruses or parasites, or even in typhoid vaccinated individuals, leading to false positives.
- Prior antibiotic therapy can also affect antibody levels and yield a false negative

13. AlphaFold3

Context:

Google Deepmind has unveiled the third major version of its "AlphaFold" artificial intelligence model, designed to help scientists design drugs and target disease more effectively.

About AlphaFold3:

- It is a new AI model developed by Google DeepMind and Isomorphic Labs.

- **It is a revolutionary model that can predict the structure and interactions of all life's molecules with unprecedented accuracy and even it mapped the behaviour for all of life's molecules, including human DNA.**

- It can generate molecules' joint 3D structure, revealing how they all fit together.
- It models large biomolecules such as proteins, DNA and RNA, as well as small molecules, also known as ligands — a category encompassing many drugs.
- Furthermore, AlphaFold 3 can model chemical modifications to these molecules which control the healthy functioning of cells, that when disrupted can lead to disease.
- It assembles its predictions using a diffusion network, akin to those found in AI image generators.

Significance:

- It allows scientists to see cellular systems in all their complexity, across structures, interactions and modifications.
- This new window on the molecules of life reveals how they're all connected and helps understand how those connections affect biological functions — such as the actions of drugs, the production of hormones and the health-preserving process of DNA repair.

14. T Cells

Context:

Results from a new clinical trial shed light on the performance of infusions of

immune-calming regulatory T cells for children with type 1 diabetes.

About T Cells:

- **T cell is a type of white blood cell.**
- It is also called T lymphocyte and thymocyte.
- **T cells are part of the immune system and develop from stem cells in the bone marrow.**
- They help protect the body from infection and may help fight cancer.

There are two main types:

- **Cytotoxic T-cells: Destroy infected cells.**
- **Helper T-cells: Send signals that direct other immune cells to fight infection.**

Rather than generically attack any antigens, T cells circulate until they encounter their specific antigen. T-cells have many identical T-cell receptors that cover their surfaces and can only bind to one shape of antigen. When a T-cell receptor fits with its viral antigen on an infected cell, the Killer T-cell releases cytotoxins to kill that cell.

15. Zero-Day Vulnerability

Context:

Google Chrome has been hit with another zero-day vulnerability, which has set the alarm bells ringing among users and cyber experts.

About Zero-Day Vulnerability:

- **A ZDV is a system or software vulnerability unknown to the vendor and for which no patch or means of mitigation are available at the time it is discovered.**
- **The term ZDV refers to the flaw itself, while zero-day attack refers to an attack that has zero days between the time the vulnerability is discovered and the first attack.**
- Zero-day exploit refers to the method or technique hackers use to take advantage of a ZDV, often via malware, and execute the attack.
- Thus, a zero-day attack occurs when threat actors develop and release malware that targets the ZDV.

Because they were discovered before security researchers and software developers became aware of them—and before they can issue a patch—ZDVs pose a higher risk to users for the following reasons:

- Cybercriminals race to exploit these vulnerabilities to cash in on their schemes.

- Vulnerable systems are exposed until a patch is issued by the vendor.

Once a ZDV has been made public, it is known as an n-day or one-day vulnerability.

16. Auroras

Context:

Indian Astronomical Observatory captured the aurora borealis on camera in Ladakh above Mount Saraswati.

About

- Northern lights were also witnessed in other parts of the world, including in the United States and the United Kingdom.
- Meanwhile, southern lights, or aurora australis, were spotted in countries such as New Zealand and Australia.

About Auroras

- Auroras are brilliant ribbons of light.
- These lights primarily appear near the poles of both the northern and southern hemispheres all year round but sometimes they expand to lower latitudes.
- In the north, the display is called the aurora borealis; in the south, it is known as the aurora australis.
- It can be seen in a range of colours, including blue, red, yellow, green, and orange.
- The colours depend on the type of gas and its altitude. Oxygen glows red or blue; nitrogen can be green, blue, or pink
- Causes: It is caused by collisions between fast-moving electrons from space with the oxygen and nitrogen in Earth's upper atmosphere.
- They are caused by magnetic storms that have been triggered by solar activity, such as solar flares (explosions on the Sun) or coronal mass ejections (ejected gas bubbles).
- Energetic charged particles from these events are carried from the Sun by the solar wind.

- Occurrence: Auroras have been observed on Jupiter, Saturn, and Uranus.

- The aurora borealis is usually visible in high-latitude regions around the Arctic and Antarctic.

17. PS4 Engine of PSLV

Context:

The Indian Space Research Organisation (ISRO) achieved yet another milestone in design and manufacturing by successfully conducting a long duration test of the PS4 engine of the PSLV stage.

About:

- It is the uppermost stage of Polar Satellite Launch Vehicle (PSLV), comprising two Earth storable liquid engines. .
- It uses a bipropellant combination of nitrogen tetroxide as the oxidizer and monomethyl hydrazine as the fuel, developed by ISRO's Liquid Propulsion Systems Centre.
- The same engine is also used in the Reaction Control System (RCS) of the first stage (PS1) of PSLV.
- ISRO redesigned the conventionally manufactured PS4 engine to make it compatible with additive manufacturing techniques and this innovative approach, known as Design for Additive Manufacturing, has yielded remarkable advantages.

Additive Manufacturing:

- It is also known as 3D printing which is an emerging technology that is rapidly transforming manufacturing processes worldwide.
- It creates 3-dimensional objects by successively layering materials under computer control.
- It involves layering materials like plastics, composites, or bio-materials to create objects that range in shape, size, rigidity, and colour.

- Compared to traditional subtractive techniques, 3D printing offers immense design flexibility, reduced waste, and the ability to produce complex geometries.

18. NISAR Satellite

Context:

Recently the ISRO Chairman S. Somanath said that the NISAR satellite will be able to monitor tectonic movements accurately and can fully map the earth twice a month.

NISAR Satellite:

- NISAR is an Earth-observation satellite that stands for (NASA-ISRO Synthetic Aperture Radar).
- It is Jointly developed by the National Aeronautics and Space Administration (NASA) and the Indian Space Research Organisation under a partnership agreement signed in 2014.
- It will be launched into a polar Sunsynchronous dawn-dusk orbit.
- NISAR is the first satellite mission to collect radar data in two microwave bandwidth regions, called the L-band and the S-band.
- The S-band payload has been made by the ISRO and the L-band payload by the U.S.

Monitoring of Earth Surface:

- The NISAR system comprises a dual frequency, fully polarimetric radar, with an imaging swath greater than 150 miles (240 km).
- This design permits complete global coverage every 12-days, allowing researchers to create time-series interferometric imagery and systematically map the changing surface of Earth.
- It can monitor various aspects in very high resolution.
- After a 90-day commissioning period, the mission will conduct a minimum of three full years of science operations with the L-band radar to satisfy NASA's requirements,
- ISRO requires five years of operations with the S-band radar.

Objectives of the Mission:

- NISAR can measure tectonic plate movements accurately. So a lot of geological, agricultural and waterrelated observations can be obtained from this satellite.
- It can study the water-stressing, climate change-related issues, agricultural changes through patterns, yield, desertification and continental movements precisely with respect to annual water cycle movements.
- NISAR's data can help people worldwide better manage natural resources and hazards, as well as providing information for scientists to better understand the effects and pace of climate change.

19. World Hydrogen Summit, 2024

Context:

For the first time, India has set up its own pavilion, at the World Hydrogen Summit 2024, which was recently held in Rotterdam, Netherlands.

- The World Hydrogen Summit is the World's Largest Dedicated Hydrogen Event.
- It is Part of the Sustainable Energy Council (SEC) World Hydrogen Series, the Official World Hydrogen Summit & Exhibition in Rotterdam.
- It has partnered with the Government of the Netherlands, Province of Zuid-Holland, the Port of Rotterdam and the City of Rotterdam for the hydrogen summit.
- The Hydrogen series of events bring together governments and companies across the entire supply chain to drive forward the industry and ensure hydrogen plays a pivotal role in the energy transition.
- The World Hydrogen Summit, 2024 was held at Rotterdam, Netherlands.

Green hydrogen in India:

- **India has set an ambitious target to achieve a green hydrogen production capacity of 5 MMT (Million Metric Tonnes) by end of the year 2030.**
- **The Strategic Interventions for Green Hydrogen Transition (SIGHT) programme is a major financial measure under the National Green Hydrogen Mission.**
- India has also notified scheme guidelines for use of Green Hydrogen in steel, transport / mobility and shipping sectors.
- The Department of Science and Technology has initiated Hydrogen Valley Innovation Clusters to foster innovation and promote Green Hydrogen ecosystem in India.
- A dedicated portal for the National Green Hydrogen Mission has been launched recently, to serve as a onestop location for information on the Mission and steps taken for the development of the green hydrogen ecosystem in India.
- The portal is an initiative of the Ministry of New and Renewable Energy.

20. Caenorhabditis elegans**Context:**

Researchers found that the worm 'Caenorhabditis elegans' develops food habits which are inherited to their offspring spanning few generations.

About:

- **RNA interference – It is a simple and rapid method of silencing gene expression in a range of organisms by RNA molecules by neutralizing the targeted mRNA molecules.**
- **It is also called as Post-Transcriptional Gene Silencing (PTGS).**
- It is a conserved biological response to double-stranded RNA that mediates resistance to both endogenous parasitic and exogenous pathogenic nucleic acids.

- **Mechanism** – An enzyme called 'Dicer' cut the long double-stranded RNA into small fragments that are known as siRNA or small interfering RNA.
- These siRNA bind to other proteins and RNAs, and either enhance or reduce the expression of other genes. **For instance: When the roundworm Caenorhabditis injects the bacterium Pseudomonas vranovensis, it also takes up a siRNA from the bacterium.**
- **This siRNA then alters the worm's feeding behaviour such that, from that point on, the worms 'know' to avoid feeding on this bacterium and save themselves from getting sick.**
- **Applications** – They are used to target cancer-related genes, controlling neurodegenerative disease and in antiviral treatments.

In food industry, it can help to lower natural plants toxins by genetic engineering.

RNA - Ribonucleic acid:

- **It is a nucleic acid present in all living cells that has structural similarities to DNA (Deoxyribonucleic acid).**
- **RNA molecule** – It can either single or double stranded but most often single-stranded, has a backbone made of alternating phosphate groups and the sugar ribose.
- Each sugar is attached to one of 4 bases: adenine (A), uracil (U), cytosine (C) or guanine (G).
- **Types** – Messenger RNA (mRNA), ribosomal RNA (rRNA) and transfer RNA (tRNA).
- **Relation with DNA** – A gene is a segment of a few thousand basepairs of the DNA molecule and every gene is instructions that tell a cell how to make a protein.
- mRNA copies the sequence of As, Ts, Cs, and Gs in a gene in the DNA into the sequence of Us, As, Gs, and Cs in their RNA.
- It moves to structures called ribosomes, where the cell assembles the corresponding protein.

Quick Facts:

- *Caenorhabditis elegans* – It is a roundworm, often called as ‘the worm’ because of its widespread use in research to understand neuronal and molecular biology.
- It was the 1st multicellular organism to have its full genome sequenced and neural wiring mapped.
- In fact, discoveries based on studying *C. elegans* were recognised by Nobel Prizes in 2002, 2006, and 2008.

21. Lead**Context:**

Researchers have developed a compact and inexpensive technology for detecting and measuring lead concentrations in water.

What is Lead?

- Lead (Pb) is in a bluish-white colour and is soft and ductile metal.
- It is a naturally occurring toxic metal found in the Earth's crust.
- **Lead is used in various industries such as paints, cosmetics, dyes, ammunition, and jewellery, among numerous others, but the battery sector remains the major consumer of this metal by utilizing 85 percent of the production.**

Lead Contamination:

- The World Health Organization estimates that 240 million people worldwide are exposed to drinking water that contains unsafe amounts of toxic lead.
- It affects brain development in children, causes birth defects, and produces a variety of neurological, cardiac, and other damaging effects. **There is no known safe blood lead concentration;** even blood lead concentrations as low as 3.5 µg/dL may be associated with decreased intelligence in children, behavioural difficulties and learning problems.

Sources of Lead Poisoning:**Anthropogenic Sources:**

- Mobilization of lead in raw materials such as fossil fuels and other extracted and treated ores and metals.
- Releases during the manufacture, use and disposal of products using lead (e.g. paint, batteries, toys).
- Direct releases from waste to soil and aquatic environment.
- Leaded gasoline.

Natural Sources:

- Volcanoes.
- Weathering of Rocks.
- Exudates from vegetation.

Lead Poisoning in India:

- The affected states are Bihar, Uttar Pradesh, Madhya Pradesh, Jharkhand, Chhattisgarh, and Andhra Pradesh accounting for 40% of the population with high blood lead levels.
- Lead toxicity in India contributes to 4.6 million Disability-Adjusted Life Years (DALYs) and 165,000 deaths annually.

22. Materiovigilance Programme of India**Context:**

Recently, the Drugs Controller General of India (DCGI) directed all medical device licence holders and manufacturers to report any adverse events related to lifesaving medical equipment on the government's Materiovigilance Programme of India (MvPI) platform.

About Materiovigilance Programme of India:

- It was launched on July 6, 2015 to monitor the safety of medical devices in the country.
- **It aims to collect data on medical device related adverse events systematically and scientifically analyse them to aid in regulatory decisions and recommendations on safe use of medical devices.**

- **Objective:** To improve Indian patient safety by monitoring, recording and analysing the root cause of adverse events or risks associated with the use of medical devices including invitro diagnostics by healthcare professionals or patients/users and suggesting regulatory bodies for appropriate action with the sole intention of improving patient safety.
- It is an important program for reporting of adverse events, coordinated analysis etc related to the medical devices including invitro diagnostic devices.
- **The Indian Pharmacopoeia Commission (IPC) functions as National Coordination Centre (NCC) since 2018.**

It is regulated by the Central Drugs Standards Control Organization (CDSCO).

- Medical devices consist of electronic equipment, implant, consumables and disposables, surgical instruments and in-vitro diagnostic reagents, among others.
- **Currently, all medical devices in India are regulated by the Drugs and Cosmetics Act, 1940 and Medical Device Rule, 2017.**
- **At present, India is 80% dependent on imports for medical devices.**

Nodal Ministry: Ministry Of Health and Family Welfare

Key facts about Drugs Controller General of India:

- Drugs Controller General of India is the head of the department of the CDSCO of the Government of India responsible for approval of licences of specified categories of drugs such as blood and blood products, IV fluids, vaccines and sera in India.
- DCGI also sets standards for the manufacturing, sales, import, and distribution of drugs in India.



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23. RoseTTAFold

Context:

AI-based prediction tool RoseTTAFold has provided a major scientific breakthrough in the last four years in the area of computational drug development.

About RoseTTAFold:

- It is developed by researchers at the University of Washington, U.S.
- **It uses generative diffusion-based architectures (one kind of AI model) to predict structural complexes.**
- **The tools' neural networks use massive amounts of input data to produce the desired output — the three-dimensional structures of proteins.**
- It uses deep learning to quickly and accurately predict protein structures based on limited information. Without the aid of such software, it can take years of laboratory work to determine the structure of just one protein.
- It is a "three-track" neural network, meaning it simultaneously considers patterns in protein sequences, how a protein's amino acids interact with one another, and a protein's possible three-dimensional structure.

It has the capability to predict not just static structures of proteins and protein-protein interactions but also their ability to predict structures and interactions for any combination of protein, DNA, and RNA.

24. NASA PREFIRE

Context:

A NASA PREFIRE polar mission is set to be launched from New Zealand on May 22.

About PREFIRE Polar Mission:

- **The Polar Radiant Energy in the FarInfraRed Experiment (PREFIRE) polar mission consists of twin satellites, each carrying one instrument and measuring the poles about six hours apart.**

- **Objective: The objective of the mission is to reveal the full spectrum of heat loss from Earth's polar regions for the first time, making climate models more accurate.**

Aim:

- The data from the PREFIRE mission is aimed at addressing the gap in knowledge and provide data to improve predictions of climate change and sea level rise.
- Provide new information on how Earth's atmosphere and how ice influences the amount of heat being radiated out to space from the Arctic and Antarctic.

How will the satellites work?

- The mission with cube satellites about the size of a shoebox will be launched aboard an Electron launch vehicle.
- It is equipped with technology proven on Mars, and will measure a "little-studied portion" of the radiant energy emitted by Earth.
- Two satellites carrying a thermal infrared spectrometer will be in asynchronous near-polar orbits and will be passing over a given spot on Earth at different times. To maximize coverage, they will be overlapping every few hours near the poles. The instruments weighing less than 6 pounds (3 kilograms) each will make readings using a device called a thermocouple, similar to the sensors found in many household thermostats.

The mission will help in:

- Understand why the Arctic has warmed more than 2½ times faster than the rest of the planet since the 1970s.
- Give scientists a better idea of how efficiently far-infrared heat is emitted by matter like snow and sea ice, and how clouds influence the amount of far-infrared radiation that escapes to space.
- It will help researchers better predict how the heat exchange between Earth and space will change in the future, and how those changes will affect phenomena like ice sheet melting, atmospheric temperatures, and global weather.

25. Synchrotron**Context:**

China's latest scientific milestone, the High Energy Photon Source (HEPS), set to be the first fourth-generation synchrotron light source in Asia, will begin operations by the end of this year.

About Synchrotron:

- A synchrotron is a type of circular particle accelerator, where particles move in a loop.
- It works by accelerating charged particles (electrons) through sequences of magnets until they reach almost the speed of light.
- These fast-moving electrons produce very bright light, called synchrotron light.
- **This very intense light, predominantly in the X-ray region, is millions of times brighter than light produced from conventional sources and 10 billion times brighter than the sun.**
- The light is channelled down beamlines to experimental workstations, where it is used for research.
- Scientists can use this light to study minute matter such as atoms and molecules.
- They can examine how a sample scatters, diffracts, absorbs, or reemits the synchrotron light, which reveals various different details of structure or chemical composition.
- There are approximately 70 synchrotrons around the world in various stages of development. There are technical differences between the use and capabilities of synchrotrons, with some being used for appliances and others for fundamental/theoretical research.

Key Facts about High Energy Photon Source (HEPS):

- **Location:** It is located approximately 50 kilometres from Beijing in Huairou, China.
- The HEPS is designed to accelerate electrons up to energies of 6 gigaelectron volts within its 1.36kilometer circumference storage ring.

- This process will produce highenergy X-rays that can penetrate deep into samples, revealing intricate details at the nanometre scale.
- HEPS will provide researchers with access to 14 beamlines catering to diverse fields such as energy, condensed matter physics, materials innovation, and biomedicine.

26. Lunar Polar Exploration Mission (LUPEX)

Context:

The India-Japan partnership for their joint moon mission, Lunar Polar Exploration Mission (LUPEX), is likely to take flight in a few years, the Japan Aerospace Exploration Agency (JAXA) said in an interview recently.

About Lunar Polar Exploration Mission (LUPEX):

- *It is a collaborative endeavour between ISRO and Japan Aerospace Exploration Agency (JAXA).*
- The mission is scheduled to launch in 2025.
- This mission will take off aboard Japan's H3 rocket.
- **Primary Goal:** To explore the moon's southern polar region, investigating the presence of water and other elements, potentially in the form of surface ice.
- It aims to showcase innovative surface exploration technologies. The special focus is on vehicular transport and lunar night survival.

It features both a lander and a rover. JAXA is responsible for developing and operating the rover, and ISRO for developing and operating the lander that will carry the rover.

- The rover will drive on its own to search for areas where water is likely to be present and sample the soil by digging into the ground with a drill.
- The plan is to acquire data by analysing the collected samples in detail with observation equipment mounted on the rover.
- The rover will be equipped with instruments for measuring the water content of regolith (lunar sand), drilling, and sampling, as well as with other world-first and worldleading technologies for the driving system and batteries.

- The rover will carry not only the instruments of ISRO and JAXA but also those of the US space agency NASA and the European Space Agency (ESA).

27. Project Astra

Context:

Recently, Google at the company's annual developer conference, presented an early version of Project Astra.

About Project Astra:

- *It is a new multimodal AI agent developed by Google.*
- *It is capable of answering real-time questions fed to it through text, video, images, and speech by pulling up the relevant information.*
- It can see the world, remember where one has left a thing and even answer if a computer code is correct by looking at it through the phone's camera.
- It even answers if a computer code is correct by looking at it through the phone's camera.
- It is more straight-forward, there is no range of emotional diversity in its voice.
- **It is not limited to smartphones. Google also showed it being used with a pair of smart glasses.**
- Project Astra can learn about the world, making it as close as possible to a human-assistant-like experience.

What is multimodal model AI?

- A multimodal model is a ML (machine learning) model that is capable of processing information from different modalities, including images, videos, and text.
- For example, Google's multimodal model, Gemini, can receive a photo of a plate of cookies and generate a written recipe as a response and vice versa.

- This model expands on generative capabilities, processing information from multiple modalities, including images, videos, and text. Multimodality can be thought of as giving AI the ability to process and understand different sensory modes.

28. Parkinson's disease

Context:

Many Parkinson's disease researchers are focused on reducing the prevalence of Synuclein alpha (SNCA) proteins in neurons as a therapeutic measure. About Synuclein alpha (SNCA) proteins:

- *It is a mysterious protein which is present in healthy cells.*
- *It is notorious for its involvement in age-related neurodegenerative diseases.*

Features of SNCA

- *It is abundant in neurons, especially in dopaminergic neurons. It is found near the nuclei of these cells and at the junctions between two neurons.*
- *It's capable of misfolding as well as forming filamentous structures.*
- So, unlike most other proteins, which take up predictable threedimensional structures, SNCA can fold in multiple ways. Misfolded proteins don't function correctly.
- SNCA is present in 2 ways as aggregates in cells: one that interferes with the structural integrity of cells' nuclei and another that allows the cell to degrade misfolded proteins.
- In these two the former are related to diseased states while the latter is important for healthy cells.
- Over time, these two SNCA populations in the cells: one was around the nuclei, shapes like filaments tens of micrometres long, much like Lewy bodies.
- The other population was also around the nuclei but as much smaller clumps called aggresomes. Such aggresomes are formed when cells localise misfolded proteins into a small bunch (like collecting the trash in a corner) for further processing.

29. Bacterial Priority Pathogens List

Context:

Recently, the World Health Organization (WHO) released its updated Bacterial Priority Pathogens List (BPPL) 2024.

About Bacterial Pathogens Priority List:

- *It is an important tool in the global fight against antimicrobial resistance.*

Background:

- *In 2017, WHO developed the first BPPL to guide investment into the R&D of new antibacterials and it listed 13 bacterial pathogens (phenotypes).*
- It was developed with the multicriteria decision analysis (MCDA) method (15).
- MCDA is a decision-making scientific method that mounts and evaluates alternatives based on multiple criteria, facilitating systematic and transparent decisionmaking in complex options
- *The 2024 WHO BPPL covers 24 pathogens, spanning 15 families of antibiotic-resistant bacterial pathogens.*
- The 2024 list categorizes these pathogens into critical, high, and medium priority groups to inform research and development (R&D) and public health interventions.

Significance:

- The WHO BPPL acts as a guide for prioritizing R&D and investments in AMR, emphasizing the need for regionally tailored strategies to effectively combat resistance.
- It targets developers of antibacterial medicines, academic and public research institutions, research funders, and public-private partnerships investing in AMR R&D, as well as policy-makers responsible for developing and implementing AMR policies and programs.

What is Antimicrobial Resistance (AMR)?

- It occurs when bacteria, viruses, fungi, and parasites no longer respond to medicines, making people sicker and increasing the risk of disease spread, illness and deaths.

Context:

The Food Safety and Standards Authority of India (FSSAI) has alerted traders'/fruits handlers/Food Business Operators (FBOs) operating ripening chambers to strictly ensure compliance with the prohibition on calcium carbide for artificial ripening of fruits, particularly during the mango season.

About:

- Calcium carbide, commonly used for ripening fruits like mangoes, releases acetylene gas which contains harmful traces of arsenic and phosphorus.

30. Calcium Carbide**Context:**

The Food Safety and Standards Authority of India (FSSAI) has alerted traders'/fruits handlers/Food Business Operators (FBOs) operating ripening chambers to strictly ensure compliance with the prohibition on calcium carbide for artificial ripening of fruits, particularly during the mango season.

About:

- Calcium carbide, commonly used for ripening fruits like mangoes, releases acetylene gas which contains harmful traces of arsenic and phosphorus.
- Concerns: These substances, also known as 'Masala', can cause serious health issues such as dizziness, frequent thirst, irritation, weakness, difficulty in swallowing, vomiting and skin ulcers, etc.
- Additionally, acetylene gas is equally hazardous to those handling it.
- Due to these dangers, the use of calcium carbide for ripening fruits has been banned under the Food Safety and Standards (Prohibition and Restrictions on Sales) Regulations, 2011.

Ethylene Gas: FSSAI has permitted the use of ethylene gas as a safer alternative for fruit ripening in India.

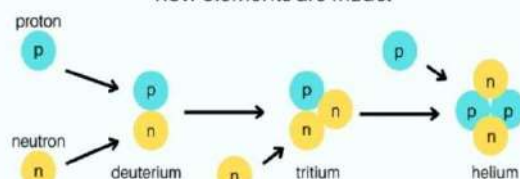
- Ethylene gas can be used at concentrations up to 100 ppm (100 µl/L), depending upon the crop, variety and maturity.
- Ethylene, a naturally occurring hormone in fruits, regulates the ripening process by initiating and controlling a series of chemical and biochemical activities.
- The treatment of unripe fruits with ethylene gas triggers the natural ripening process until the fruit itself starts producing ethylene in substantial quantities.

31.**About:**

- Stellar nucleosynthesis is the process by which stars forge elements inside their cores. .
- The only element not formed in this way is hydrogen, the most abundant and lightest element in the universe: it was formed in the initial aftermath of the Big Bang. .
- The cores of stars have crushing pressures and temperature. For example, the sun's core temperature is about 15 million degrees C. In these harsh conditions, the nuclei of atoms undergo nuclear fusion.
- The hydrogen nucleus is just one proton. Inside the core, these nuclei come together to form helium nuclei (two protons and two neutrons). This is the p-p (short for protonproton) process.

**Nucleosynthesis**

Nucleosynthesis is the formation of atomic nuclei. It is how elements are made.



Nucleosynthesis mainly occurs when lighter elements combine (fusion) or heavier elements break apart (fission and

32. Genetic drift**Context:**

Genetic drift, not natural selection, was recently identified as the main factor driving speciation in endangered pupfish species.

About Genetic Drift:

- It is one of the basic mechanisms of evolution.
- It takes place when the occurrence of variant forms of a gene, called alleles, increases and decreases by chance over time in a population.
- This occurs due to random sampling and the random events that influence the survival and reproduction of those individuals.
- These variations in the presence of alleles are measured as changes in allele frequencies.
- Small populations are more susceptible to genetic drift than large populations, whose larger numbers can buffer the population against chance events.
- Once it begins, genetic drift will continue until the involved allele is either lost by a population or until it is the only allele present in a population at a particular locus.
- Both possibilities decrease the genetic diversity of a population.
- It could also cause initially rare alleles to become much more frequent, and even fixed.
- Genetic drift is common after population bottlenecks, which are events that drastically decrease the size of a population.
- In these cases, genetic drift can result in the loss of rare alleles and decrease the gene pool.
- Genetic drift can cause a new population to be genetically distinct from its original population, which has led to the hypothesis that genetic drift plays a role in the evolution of new species.

Genetic Drift vs Natural Selection:

- Genetic drift is the converse of natural selection.

- The theory of natural selection maintains that some individuals in a population have traits that enable them to survive and produce more offspring, while other individuals have traits that are detrimental and may cause them to die before reproducing.

- Over successive generations, these selection pressures can change the gene pool and the traits within the population.
- Thus, organisms that are more adapted to their environment are more likely to survive and pass on the genes that aided their success. This process causes species to change and diverge over time.

Unlike natural selection, genetic drift describes the effect of chance on populations in the absence of positive or negative selection pressure.

33. eVTOL Aircraft**Context:**

Indian Institute of Technology, Madras incubated ePlane Company is expected to launch its e-flying taxis in Bengaluru this year but the Indian government has yet to establish clear policies regarding eVTOL flying taxis.

About eVTOL Aircraft:

- An electric Vertical Take-Off and Landing (eVTOL) aircraft is one that uses electric power to hover, take off and land vertically.
- It is one of the newer technologies and developments in the aerospace industry.
- It is a low-altitude urban air mobility aircraft capable of carrying only a few passengers- six-seaters and eightseaters.

Technology used:

- Most eVTOLs use distributed electric propulsion technology which means integrating a complex propulsion system with the airframe. There are multiple motors for various functions; to increase efficiency; and to also ensure safety.

- This is a technology that has grown on account of successes in electric propulsion based on progress in motor, battery, fuel cell and electronic controller technologies and also fuelled by the need for new vehicle technology that ensures Urban Air Mobility (UAM).

Applications: Air Taxi, Delivery, Medical assistance (EMS), Cargo Transport, Recreation.

Significance: In the near future, these eVTOLs will enhance “on-demand” mobility for intra- and intercity transportation, improving connectivity between metropolitan city centres and airports.

34. Goldene

Context:

For the first time, researchers have created a free-standing sheet of gold that is only one atom thick and named it as Goldene.

About Goldene:

- **It is the first free-standing 2D metal and is only one atom thick.**

How is it created?

- Researchers first sandwiched an atomic monolayer of silicon between layers of titanium carbide.
- When they deposited gold on top of this sandwich structure, the gold atoms diffused into the material and replaced the silicon atoms, forming a trapped monolayer of gold atoms.
- Subsequently, scientists etched away the titanium carbide layers to create a free-standing, one atom thick layer of gold.
- This was done with the help of an age-old Japanese technique used to forge katanas and high-quality knives, using a chemical popularly known as Murakami's reagent.
- These sheets of goldene are roughly 100 nano metres thick (a nanometre is a billionth of a metre), approximately 400 times thinner than the thinnest commercially available gold leaf.

Applications

- It can be used in the **electronics industry**.
- It could also be used in **carbon dioxide conversion, hydrogengenerating catalysis, selective production of value-added chemicals, hydrogen production, water purification, etc.**

Significance: It holds promise as a great catalyst because it's much more economically viable than thicker, threedimensional gold.

35. Food Irradiation

Context:

Indian government plans to expand irradiation process to boost shelf life of onion buffer stock. What is Food Irradiation?

- Food irradiation is used in food processing to help ensure food safety. In food irradiation, ionizing radiation uses electricity, x-rays and gamma rays to destroy microorganisms, such as bacteria, viruses or insects in food.

Advantages of Food Irradiation

- Food irradiation helps to prevent foodborne illnesses as the organisms responsible for causing foodborne illnesses are eradicated using this process. Due to this, the food shelf-life increases, and it can last longer, offering no change in taste or texture.
- In comparison with heat or chemical treatment, irradiation is considered a more effective and appropriate technology to destroy food borne pathogens.
- Food Irradiation cannot induce any radioactivity in food and does not leave any harmful or toxic radioactive residues on foods as is the case with chemical fumigants.
- Treatment is done after final packing so no repacking is required.

Limitations:

- Radiation processing cannot be applied to all kinds of foods.

- It cannot destroy already present pesticides and toxins in foods.

Food Irradiation in India:

- For commercial application of the technology in India, Atomic Energy (Control of Irradiation of Food) Rules were notified in 1991, and later amended in 1996. In 2012, a new amendment resulted in the notification of the current Atomic Energy (Radiation Processing of Food and Allied Products) Rules, 2012
- Atomic Energy Regulatory Board (AERB) is the regulatory authority in India for enforcing these rules.
- As per Food Safety Standards (Food Product Packaging and Labelling) Regulations, 2011, the irradiated products are labelled and can be identified with the 'Radura' logo.

36. Astronomical Transients

What are Astronomical Transients?

- In astronomy, a 'transient' is any celestial object whose brightness changes in short spans of time.
- There are many kinds of astronomical transients, all of them united by phenomena that are violent in some measure.
- Astronomers study transients to understand where their violence comes from and what that can tell us about non-transient events.

Examples of Astronomical Transients:

- **Supernova:** A supernova is what happens when a star has reached the end of its life and explodes in a brilliant burst of light.
- **Active galactic nucleus (AGN):** The centers of massive galaxies host supermassive black holes. Sometimes, these black holes actively feast on matter in their orbit.
 - Interactions between the black holes and the matter in this process cause the latter to acquire energy and glow with a changing brightness.

- **Fast radio burst (FRB):** It was discovered in 2007 and can emit more than 10-times as much energy as the Sun in a few milliseconds.

37. Zero Debris Charter

Context:

Twelve nations and the European Space Agency (ESA) have signed the Zero Debris Charter at the ESA/EU Space Council.

About:

- The Zero Debris Charter is a world leading effort to become debris neutral in space by 2030 that was unveiled at the ESA Space Summit in Seville meeting in November 2023.
- **Parties:** Austria, Belgium, Cyprus, Estonia, Germany, Lithuania, Poland, Portugal, Romania, Slovakia, Sweden and the United Kingdom have all pledged to adhere to the charter.

Need for the charter

- ESA estimates that there are currently more than one million pieces of space debris larger than one cm in Earth orbit.
- Each of these objects is capable of causing catastrophic damage to space assets.
- Hence quick and decisive action is required to improve the sustainability of space activities.

38. Human Eyes and colours

Context:

Colour plays an outsized role in the human experience of modern life as it invests both natural and synthetic worlds with beauty and meaning. What is colour?

- **Colour is a type of information our eyes receive and process based on electromagnetic radiation.**
- An object by itself can't be said to have a colour — but based on which frequencies of visible-light radiation it absorbs, reflects, and/or scatters, we can perceive the object to have a particular colour.

How do human eyes perceive colours?

- In the human eye, the rod and the cone cells receive information in the light that strikes the eye.
- The rod cells record brightness while the cone cells record the wavelengths, which the human brain interprets as colour.
- Humans possess three types of cone cells and are called trichromats.
- **Human vision is restricted to wavelengths from 400 nm to 700 nm.**
- Honeybees can also see ultraviolet light and mosquitoes and some beetles can access information in some wavelengths of infrared radiation.

Science of colours:

There are two broad ways to render colours: additive and subtractive colouring. In additive colouring, light of different wavelengths is 'mixed' to yield light of one combined colour.

- **The colours on the smartphone screens and television sets are produced in this way.**
- LEDs use additive colouring to produce colours.

In subtractive colouring, a colour is rendered by passing white light through a medium that absorbs, or takes away, specific wavelengths of light, leaving the rest to render a particular colour.

- **Its examples include dyes, pigments, and inks.**

39. Caterpillars**Context:**

According to a recent study, Caterpillars have a sixth sense that most land-based animals do not. **About Caterpillars:**

- Caterpillars are the larvae (immature forms) of butterflies and moths.
- There are many thousands of types, with a huge variety of colours and sizes.

- They look like worms and are covered in small hairs. Most are harmless, but some can cause allergic reactions.
- **They can sense electric fields around them with small bristles called setae on its body — a feat called electroreception.**
 - Since 2013, scientists have also found electroreception in arthropods like bumblebees, hoverflies, and spiders.
 - However, none of these landbased creatures use the ability to defend against predators.
 - Caterpillars, which are also arthropods, may break this mould, using electroreception to sense predatory insects nearby.

40. Magellan Mission**Context:**

After analysing the archived data from NASA's Magellan mission, scientists say they observed new lava flows on Venus, suggesting that the planet was volcanically active between 1990 and 1992.

About Magellan Mission:

- **It was a deep space mission launched by NASA on May 4, 1989, to explore the planet, Venus.**
- It was launched from Cape Canaveral aboard the space shuttle Atlantis. It was the first interplanetary mission launched from the Space Shuttle and the first spacecraft to use the Inertial Upper Stage booster.
- It was named after the Portuguese explorer Ferdinand Magellan, who was the first to circumnavigate the earth.
- **The primary goal of the Magellan mission was to map the surface of Venus using radar imaging, as the thick atmosphere of the planet made visual observation difficult.**

- The Magellan spacecraft, which arrived at Venus in 1990, made the first global map of the surface of Venus as well as global maps of the planet's gravity field.
- The mission produced surprising findings about Venus, including a relatively young planetary surface possibly formed by lava flows from planet-wide volcanic eruptions.
- In October 1994, the Magellan spacecraft intentionally plunged to the surface of Venus to gather data on the planet's atmosphere before it ceased operations.

It marked the first time an operating planetary spacecraft had been intentionally crashed.

41. DD KISAN

Recently, Doordarshan Kisan (DD KISAN) has become the first government TV channel in the country to launch two AI anchors named AI Krish and AI Bhoomi. These will act as information hubs for farmers, delivering updates on subjects like

- Cutting-edge advancements in agricultural research.
- Price fluctuations and trends in agricultural markets (mandis).
- Weather forecasts that could impact crops.
- Details of government schemes supporting agriculture.

They can speak in 50 languages and read news 24 hours and 365 days.

- The initiative aims to serve the agricultural and rural community, with a focus on educating and promoting holistic development.
- DD Kisan is an Indian state-owned agriculture television channel, founded by the Ministry of Information and Broadcasting.
- It is the flagship channel of Doordarshan, launched on 26th May 2015.

- **It aims to cater to the farming and rural community, to strengthen the three-dimensional concept of agriculture, including balanced farming, animal husbandry, and plantation.**

42. GM mosquitoes

Context:

Djibouti releases GM mosquitoes to fight malaria as part of a pilot project. This is the 1st time a GM mosquito has been released in East Africa and the 2nd time on the African continent. Burkina Faso in West Africa conducted the 1st ever release of GM mosquitoes in Africa.

- **Umbrella Programme – Djibouti Friendly Mosquito Programme, that aims to stop the spread of Anopheles stephensi.**
- **Production –** They are produced using a technique called embryonic microinjection.
- An engineered DNA often called a transgene when injected in mosquito eggs integrates into the mosquito genome and specifically activates or inactivates a target gene.
- **GM mosquitoes are made to carry 2 types of genes:**
 - **A self-limiting gene –** It prevents female mosquito offspring from surviving to adulthood.
 - **A fluorescent marker gene –** It glows under a special red light, allowing the researchers to identify them in the wild.
- **Control method –** It targets female mosquitoes, as male mosquitoes do not bite and therefore cannot transmit malaria.
- This method targets only the particular species of mosquitoes which was genetically modified, here it is Anopheles stephensi.
- **GM mosquitoes have been successfully used in parts of Brazil, the Cayman Islands, Panama, and India to control Aedes aegypti mosquitoes. Since 2019, over 1 billion mosquitoes have been released.**

43. Golden Rice**Context:**

A court in the Philippines recently revoked biosafety permits for commercial propagation of genetically modified golden rice.

About:

- **Golden Rice is a new type of rice that contains beta carotene (provitamin A, a plant pigment that the body converts into vitamin A as needed).**
- This compound is what gives this grain its yellow-orange or golden colour, hence its name.
- **Golden Rice is developed through genetic engineering.**

Philippines became the first country to approve commercial production of the rice variety in 2021. Golden Rice is an enhanced version of ordinary rice designed to handle a specific nutrition issue, without any additional cost or difference in taste.

- While Golden Rice is expected to cost and taste the same as regular rice, its beta carotene content makes it a valuable asset in the battle against vitamin A deficiency (VAD).
- **Like ordinary rice, Golden Rice does not require any special cultivation practices, and generally has the same yield and agronomic performance.**
- The World Health Organization has classified vitamin A deficiency as a public health problem affecting about 1/3rd of children aged 6 to 59 months in 2013, the highest rates in sub-Saharan Africa (48 %) and South Asia (44 %).

44. New phage therapy**Context:**

New phage therapy treatment can treat antibiotic-resistant infections in all animals. Phage Therapy:

- **Phages or Bacteriophages – They are natural viruses that can selectively target and kill bacteria.**

• **Phage therapy – It is a treatment for people suffering from chronic or antibiotic-resistant infections.**

- **General therapy** – It has also been used in cows, chickens, and other farm animals.
- The US Food and Drug Administration (FDA) has approved the use of general phage therapy in the food industry, largely in the dairy and meat industry, to combat bacterial growth.
- **Personalised therapy** – The specific phages used are tailored to the individual patient's infection, as determined through bacterial culture and genetic analysis.
- **Advantages** – Decrease the bacterial load, faster wound healing and nontoxic compared to standard antibiotics.
- **Disadvantages** – Treatment currently specific to only some kinds of bacteria and it can be applied only to wounds that are shallow and accessible by light.
- **Current research** – Phage therapy treatment for a 5-year-old Siamese cat that suffered from an infection with *P. aeruginosa* bacteria.
- **Pranav Johri is the 1st Indian who underwent the phage therapy from Nov 2016- March 2018.**

45. Recombinant Proteins**About Recombinant Proteins:**

- **These are proteins encoded by recombinant DNA that has been cloned in an expression vector that supports expression of the gene and translation of messenger RNA.**
- Modification of the gene by recombinant DNA technology can lead to expression of a mutant protein.
- It is a manipulated form of native protein, which is generated in various ways in order to increase production of proteins, modify gene sequences, and manufacture useful commercial products.

- It is created by fusing sequences that may not be normally present in an organism.

Recombinant proteins, such as vaccine antigens, insulin and monoclonal antibodies, are mass-produced by growing modified bacterial, viral or mammalian cells in large bioreactors. The most widely used organism is the yeast *Pichia pastoris* (now called *Komagataella phaffii*).

Application of Recombinant Proteins

- *It is used in biomedical research to understand health and disease.*
- *It is used in biotherapeutics.*
- *It is used to produce protein-based polymers for drug delivery, antibodies and enzymes for disease treatment, protein scaffolds for tissue engineering etc.*

What is protein?

- It is the workhorse in biological systems facilitating most of biological processes in a cell, including gene expression, cell growth, proliferation, nutrient uptake, intercellular communication and apoptosis.
- The blueprint for protein synthesis is stored in DNA, which serves as a template for highly regulated transcriptional processes to produce messenger RNA (mRNA).



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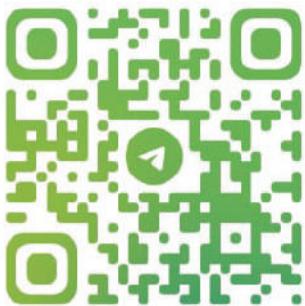
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5	CA August 2024	13-10-2024
6	CA September 2024	27-10-2024
7	CA October 2024	17-11-2024
8	CA November 2024	15-12-2024
9	CA December 2024	12-01-2025
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INTERNATIONAL RELATIONS

1. Commission on Population and Development

Context:

The Permanent Mission of India to the United Nations and the Ministry of Panchayati Raj, in collaboration with the United Nations Population Fund is organizing event titled “Localizing the SDGs: Women in Local Governance in

India Lead the Way” during the 57th Session of the Commission on Population and Development (CPD57). UN Commission on Population and Development:

- It was established by the Economic and Social Council (ECOSOC) in 1946, which was renamed as the Commission on Population and Development by the General Assembly in 1994.

Members: It is composed of 47 member countries.

- Term: Member countries are elected by the Economic and Social Council for a period of four years on the basis of geographic distribution.
- It was constituted as a three-tiered intergovernmental mechanism that plays the primary role in the follow up to the implementation of the programme of action at the national, regional and international levels and advise the Council thereon.
- The meetings of commission were held typically every two or three years until 1994, after which it was held once a year.

United Nations Population Fund:

- It is an international development agency created in 1968 to support the execution of projects and programmes in the area of population and sexual and reproductive health.
- In 1987, it was officially renamed as the United Nations Population Fund but the original abbreviation UNFPA (United Nations Fund for Population Activities) was retained.
- It is not directly responsible for the collection of primary statistics; it plays an important role in the technical and financial support of statistical activities in countries, such as population censuses and thematic surveys etc.

2. Location of Netherlands

Context:

12th India-Netherlands Foreign Office Consultations were held in The Hague, Netherlands.

Political features:

- Located in north-western Europe, also known as Holland.
- Land Boundary: Belgium (south) and Germany (east).
- **Water Bodies: North Sea (north and west).**



3. Chloropicrin

Context:

The U.S. The State Department accused Russia of having used chloropicrin as a chemical weapon against Ukrainian forces in violation of the Chemical Weapons Convention.

More in News:

- The U.S. The State Department also accused Russia of using tear gas on the battlefield as a method of warfare in Ukraine, also in violation of the CWC
- Tear gas is a collective name for any lachrymatory — or tears-inducing — agent; popular examples include pepper spray, and

About chloropicrin

- The chemical compound chloropicrin is used both as a warfare agent and pesticide.
- It is also known as nitro chloroform and is also employed as an antimicrobial agent, and as herbicide and nematicide.
- It's manufactured today in a chemical reaction involving sodium hypochlorite (which in dilute form is called bleach) and nitromethane (a common industrial solvent).
- It can also be made by combining chloroform with nitric acid, which yields chloropicrin and water.
- **Instances of Usage:** It was made as a poison gas in the First World War, by both the Allied and the Central Powers.

Health concerns

- Chloropicrin has documented irritating and tears-inducing effects on humans, and is also known to be highly toxic and carcinogenic.
- It can also induce vomiting, which was known to prompt soldiers to remove their masks, when they would inhale more of the gas, or other gaseous agents dispersed in the air.

Chemical Weapons Convention:

- The Chemical Weapons Convention (CWC) is an international treaty aimed at eliminating the production, stockpiling, and use of chemical weapons and their precursors. The Treaty was adopted on September 3, 1992, and entered into force on April 29, 1997. It currently has 193 member states.
- It makes it mandatory to destroy old and abandoned chemical weapons.
- India signed the treaty in January 1993.

4. Panama**Context:**

Panama is on the verge of a dramatic change to its immigration policy that could reverberate from the dense Darien jungle to the U.S. border.

About Panama

- It is a country in Central America located on the Isthmus of Panama, the narrow bridge of land that connects North and South America. It is bordered by Costa Rica and Colombia and is situated between the Caribbean Sea and the North Pacific Ocean.

Embracing the isthmus and more than 1,600 islands off its Atlantic and Pacific coasts, the tropical nation is renowned as the site of the Panama Canal, which cuts through its midsection.

- Most Panamanians are descended from indigenous, or native, people, Europeans, Afro-Caribbeans, and immigrants from all over the world.
- Panama has the largest rainforest in the Western Hemisphere outside the Amazon Basin.
- Capital: Panama City Language: Spanish

What is the Panama Canal?

- It is a constructed waterway that connects the Atlantic and Pacific oceans across the Isthmus of Panama.
- It is one of the two most strategic artificial waterways in the world, the other being the Suez Canal.
- It is approximately 80 kilometres long.
- The canal was built by the United States between 1904 and 1914, and it was officially opened on August 15, 1914.
- It is owned and administered by the Republic of Panama since the oversight of the Canal was transferred from the United States to Panama in 1999.
- The Panama Canal consists of a series of locks that raise and lower the water level to facilitate the passage of ships through the continental divide.

5. Moldova

Context:

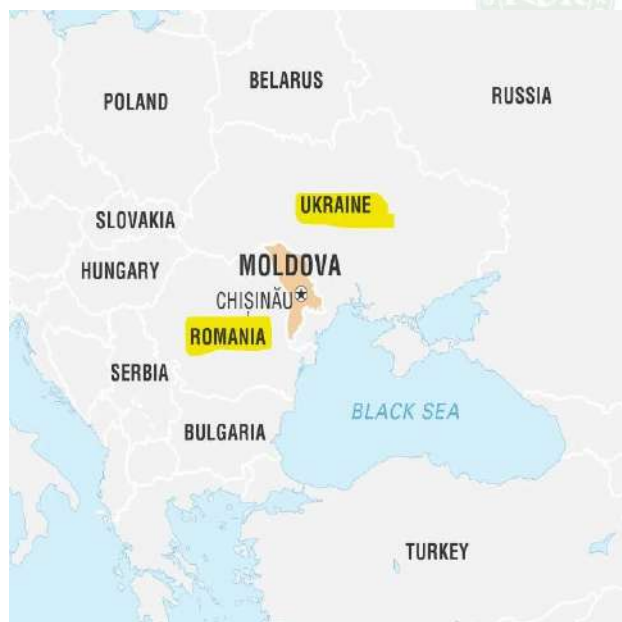
India and Moldova signed an agreement on visa waiver for diplomatic and official passports.

About

- The agreement will allow holders of diplomatic and official passports of either country to travel to the other, without a visa.
- Diplomatic relations between India and Moldova were established in 1992.

Moldova

- Moldova, is a landlocked country lying in the northeastern corner of the Balkan region of Europe. It is bordered by Ukraine and Romania.
- Rivers: Prut river, Dniester River, Danube River etc.
- It lies to the east of the great arc of the Carpathian Mountains.



6. Nakba

Context:

May 15, 1948 was the beginning of the Arab-Israeli war and has long been a day that Palestinians take to the streets to protest against their displacement.

What is Nakba?

- The Arabic word Nakba means catastrophe, or disaster.
- In reference to the Israeli-Palestinian conflict, the term Nakba or al-Nakba refers to the Palestinians having lost their homeland during and after the 1948 Arab-Israeli war.
- It's thought that around 700,000 people in what is now Israel either fled or were forced from their homes. Many Palestinian refugees abroad remain stateless to this day.

What is Nakba Day?

- May 15, 1948 was the beginning of the Arab-Israeli war and has long been a day that Palestinians take to the streets to protest against their displacement.
- Many carry Palestinian flags, bring the keys of their former homes or carry banners with the symbols of keys, illustrating the hope of returning home and what the community sees as their right to return.
- In the past, some protests have turned into violent clashes. Israel has accused Hamas and other organizations that are listed by the EU and other countries as terror organizations of using the day to further their causes.
- The term Nakba Day was coined in 1998 by then-Palestinian leader Yasser Arafat.
- He set the date as the official day for the commemoration of the loss of the Palestinian homeland.

7. President Putin

Context:

President Putin is on his 19th visit to China since becoming Russia's leader.

About:

- During the Cold War, China and the USSR were rivals, competing for control of the global communist movement.
- Tensions between the countries rose dangerously in the early 1960s, and they fought a brief border war in 1969.
- **The Sino-Soviet border conflict was a seven-month undeclared military conflict between the Soviet Union and China in 1969, following the SinoSoviet split.**
- **The most serious border clash, which brought the world's two largest communist states to the brink of war, occurred near Damansky (Zhenbao) Island on the Ussuri (Wusuli) River in Manchuria.**

8. Overseas Island Territories

Context:

- France declared a state of emergency in New Caledonia amid recent protests over the bill passed on voting rights granted to French Residents of the Island.
- Many pro-independence Kanaks see this as a possible marginalisation of their votes' significance.

Overseas Island territories	Located in
1. Faroe Islands (Denmark)	Atlantic Ocean
2. New Caledonia (France)	Pacific Ocean
3. Svalbard (Norway)	Arctic Ocean
4. Tromelin Island (France)	Indian Ocean

About:

- It is a French overseas island territory in the Pacific Ocean.
- Location: New Caledonia is located around 1,500 km to the east of Australia.
- **Demography:** Indigenous groups, specifically the Melanesian Kanak people, have inhabited it for a few thousand years.
- **History:** Western colonial interest in the island began with the arrival of British explorer James Cook in 1774.
 - o In 1853, it was annexed by France – beginning a long period of control over the island resulting in a significant French population.
 - o In 1998, the Nouméa Accord was signed between France and New Caledonia for granting limited autonomy to the island.
 - o Further, three referendums have been held – in 2018, 2020 and 2021 – on the question of independence. In all three cases, the majority voted against independence.
- **Polity:** There are 41% Melanesian Kanaks and 24% people of European origin (mostly French).
 - o The Kanaks generally favour independence, while European-origin groups and other immigrants want French rule to continue.

9. Gulf of Aden

Context:

European Union naval forces recently arrested six suspected pirates after they allegedly opened fire on an oil tanker traveling through the Gulf of Aden.

About Gulf of Aden:

- It is an extension of the Indian Ocean, located between the Arabian Peninsula and the African continent.
- It connects the Red Sea to the Arabian Sea and ultimately the Indian Ocean.

- The gulf is named after “Aden,” a port city on Yemen’s coast.
- It is bounded to the south by Somalia and the Socotra Islands (part of Yemen), north by Yemen, east by the Arabian Sea, and west by Djibouti.
- The gulf is connected to the Somali Sea to the south by the Guardafui Channel, and to the Red Sea on the west by the Strait of Bab el Mandeb.
- In the west, it narrows into the Gulf of Tadjoura, near Djibouti.
- It is demarcated from the Arabian Sea by the Horn of Africa and the Socotra Islands.
- Some of the major cities near the gulf include Aden, Mukalla, Ahnwar, Balhaf, Berbera, Bosaso, and Djibouti City. Major Ports: Aden in Yemen, and Berbera and Bosaso in Somalia.
- It is also a critical part of the Suez Canal shipping route, which connects the Red Sea and the Mediterranean Sea.



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10. MATES Migration Scheme

Context:

The Australian Federal Budget Document, released recently, announced the start date for the Mobility Arrangement for Talented Early-professionals Scheme (MATES) for Indian Nationals.

About MATES Migration Scheme:

- On May 23, 2023, Australia and India entered into a Migration and Mobility Partnership Arrangement (MMPA).
- The MMPA is a bilateral framework that supports and promotes two-way migration and mobility between our two countries while addressing issues pertaining to illegal and irregular migration.
- The Mobility Arrangement for Talented Early-Professionals Scheme, or ‘MATES’, is a new scheme established under the MMPA to enable the temporary mobility of Indian university graduates and early career professionals.

MATES aims to encourage mutually beneficial skills and knowledge transfer between Australia and India.

- Under the scheme, Indian graduates and early career professionals (aged 18 to 30 years) with knowledge and skills in targeted fields of study will be offered a new temporary mobility pathway, to live and work in Australia for up to two years.

Eligibility Criteria for MATES: MATES will be open to Indian Nationals who are:

- Must be 30 years old or younger at the time of application
- Have not previously participated in MATES
- Have proficient English language skills
- Have graduated within two years from an eligible educational institution at the time of application
- Hold a qualification (Bachelor’s degree or higher) in target fields of study

There will be no requirement for sponsorship by an Australian employer to be eligible to apply for a visa as part of MATES.

What are the permitted activities?

- MATES participants will be able to live and work in Australia for up to 2 years.
- Whilst there is no strict requirement for visa holders to work in their nominated field of study, it is designed to support young professionals expand their skills and networks, particularly within the specified sectors.

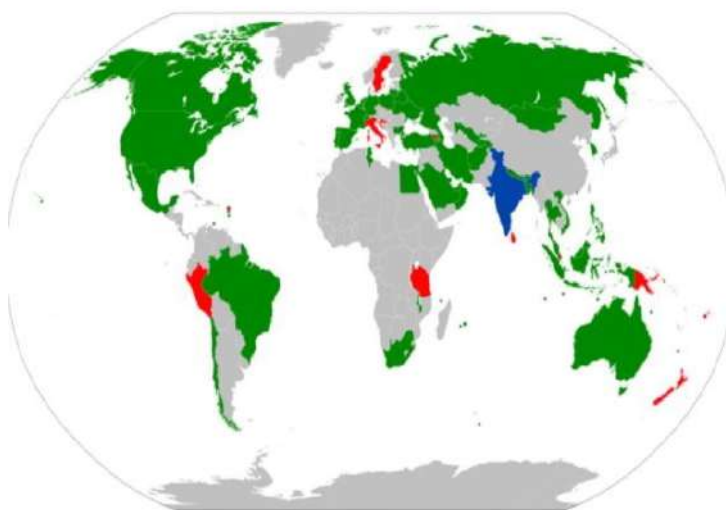
As a pilot initiative, MATES will initially offer 3,000 places for primary applicants per program year.

Participants will be able to apply to bring dependents (spouses and dependent children). Dependents will have work rights in Australia, and will not count towards the annual cap.

11. Extradition

About:

Extradition is the process by which one state, upon the request of another, affects the return of a person for trial for a crime punishable by the laws of the requesting state and committed outside the state of refuge. . At present India has an Extradition treaty with more than 40 countries and Extradition agreement with 11 countries. Countries apart from the ones given below have no Extradition Treaty or Extradition Arrangement with India.



- - India.
- - Countries which have an extradition treaty with India.
- - Countries which have extradition arrangements with India.

Consular, Passport and Visa Division of the Ministry of External Affairs, administers the Extradition Act and it processes incoming and outgoing Extradition Requests.

12. State of Palestine

Context:

Norway, Ireland and Spain announced that they will formally recognise the state of Palestine.

About:

- A total of 143 out of 193 memberstates of the UN have recognised a Palestinian state. (3/4 of 193 = 144.75)
- India along with 142 other nations voted in favour of a draft U.N. General Assembly resolution determining qualification for a full United Nations membership for the Palestine State.

UNGA urged the Security Council to reconsider Palestine's membership request according to Article 4 of the UN Charter.

- The recent Resolution, while providing Palestine with some new rights and privileges, broadly reaffirms that it remains a nonmember observer state without full U.N. membership, as the resolution only determines whether the State of Palestine is qualified for membership or not.

Countries that recognise Palestine

As of May 22, 2024



13. Arab League

Context:

The Arab League recently called for UN peacekeeping forces in the Palestinian territories during a summit in Bahrain's Manama.

About Arab League:

- The Arab League, also called the League of Arab States (LAS), is a regional organization of Arab states in the Middle East and parts of Africa.

Formation:

- It was formed in Cairo on March 22, 1945.
- The league was chartered in response to concerns about postwar colonial divisions of territory as well as strong opposition to the emergence of a Jewish state on

Palestinian territory.

Goals:

- The overall aim of the league is to promote Arab interests.
- Its main goals are to strengthen and coordinate the political, cultural, economic, and social programs of its members and to try to settle disputes among them or between them and third parties.
- In 1950, the members also agreed to provide military support to help defend each other.
- Headquarters: Cairo, Egypt.
- Official language: Arabic

Members:

- Currently, it has 22 members. The founding member states of the league are Egypt, Syria, Lebanon, Iraq, Jordan, Saudi Arabia, and Yemen.
- Members who joined later are Libya, Sudan, Tunisia, Morocco, Kuwait, Algeria, Bahrain, Oman, Qatar, the United Arab Emirates, Mauritania, Somalia, the Palestine Liberation Organization, Djibouti, and Comoros.
- The League regards Palestine as an independent state.

- There are four nations that were conferred observer status by the League: Brazil, Eritrea, India, and Venezuela.

Council:

- The highest body of the league is the Council, composed of representatives of member states, usually foreign ministers, their representatives, or permanent delegates.
- The League makes decisions on a majority basis, but there is no mechanism to compel members to comply with resolutions.
- Each member has one vote on the Council, with decisions binding only on those states that have voted for them.

14. BIMSTEC Charter

Context:

BIMSTEC Charter comes into force after Nepal's ratification.

About:

- BIMSTEC – Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation, a regional organization group of littoral countries of the Bay of Bengal with own flag and emblem.
- **Established in – 1997, by the Bangkok Declaration.**
- The year 2022 marked the 25th anniversary of BISTEC formation.
- **Secretariat at – Dhaka, Bangladesh.**
- Aim – To foster economic & social development among members.
- **7 members – Bangladesh, Bhutan, India, Nepal, Sri Lanka, Myanmar and Thailand.**
- Initially known as BIST-EC (Bangladesh, India, Sri Lanka, Thailand- Economic cooperation) before the joining of Myanmar (1997), Bhutan (2004) and Nepal (2004). Thus, it includes 5 members from SAARC and 2 from ASEAN.

BIMSTEC Charter:

- It is a testament to the shared commitment of the BIMSTEC Members to promote regional cooperation in various sectors.
- Signed in – 2022, at the 5th BIMSTEC summit held virtually in Colombo, Sri Lanka (Sri Lanka was the chair).
- Came into force in – 2024, after Nepal's ratification, as it required every member country to ratify to come into force.
- **Significance** – Gives the organisation a legal personality and establishes an institutional framework.
- All decisions will be taken by consensus among current members.
- Conducting the leaders' summit every 2 years and indicates the procedure for the rotational chairmanship of the organisation.
- Establishes a mechanism for admitting new members & observers.
- Enables structured diplomatic dialogue with other groupings and countries.

15. Antarctic Parliament [Antarctic Treaty Consultative Meeting (ATCM)]:

- Antarctic Parliament is also known as the Antarctic Treaty Consultative Meeting (ATCM).
- The ATCM is an annual meeting of the Consultative Parties to the Antarctic Treaty, which includes the original 12 Parties and those conducting substantial Antarctic research.
- The purpose is to exchange information, consult on Antarctic matters, and recommend measures to further the Treaty's principles and objectives.
- Meetings rotate annually between Consultative Parties, ordered alphabetically by English name.

Attendees include:

- Consultative Parties
- Non-Consultative Parties

- **Observers** Scientific Committee on Antarctic Research (SCAR)
 - the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)
 - Council of Managers of National Antarctic Programs (COMNAP) (SCAR, CCAMLR, COMNAP)
- **Invited Experts**
 - Antarctic and Southern Ocean Coalition (ASOC)
 - International Association of Antarctica Tour Operators (IAATO)

Only the Consultative Parties take part in decision-making. Other participants in the meeting, however, may contribute to the discussions. India is hosting the 46th Antarctic Treaty Consultative Meeting (ATCM 46), also known as the Antarctic Parliament, from May 20-30 in Kochi.

- The National Centre for Polar and Ocean Research, Goa, through the Ministry of Earth Sciences (MoES), has organised the meeting, which will be attended by the 56 member countries of the Antarctic Treaty.
- India had last hosted the ATCM in New Delhi in 2007.

16. India and GCC**Context:**

The United States and the Gulf Cooperation Council recently announced a new iteration of defense working groups to be based in Saudi Arabia to 'advance USGCC cooperation and multilateral (missile) integration against shared air and maritime threats.'

India and GCC:

- GCC is India's largest regional-bloc trading partner.
- Trade with the GCC comprised 15.8% of India's total trade in FY2022-23.

- The UAE has consistently been India's principal trading partner within the Gulf and is India's third largest trading partner overall.
- According to the latest figures, there are approximately 8.9 million Indian expats residing in GCC countries, which is approximately 66% of non-resident Indians.

About Gulf Cooperation Council (GCC)

- It is a political and economic alliance of six countries in the Arabian Peninsula: Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates.
- The GCC was established in Riyadh, Saudi Arabia, in May 1981.
- **Objective:** To promote economic, security, cultural, and social cooperation between the six states and hold a summit every year to discuss cooperation and regional affairs.
- Together, the GCC countries possess almost half of the world's oil reserves.

Organizational structure:

The Supreme Council:

- It is the highest authority of the organization, which meets on an annual basis and consists of GCC heads of state.
- Decisions of the Supreme Council are adopted by unanimous approval.
- Its presidency rotates periodically among the member states in alphabetical order.

The Ministerial Council:

- It is composed of the foreign ministers of all the Member States or other ministers deputizing for them.
- It meets every three months to implement the decisions of the Supreme Council and to propose new policy.

The Secretariat General:

- It is the administrative arm of the alliance, which monitors policy implementation and arranges meetings.

- Its headquarters is in Riyadh, Saudi Arabia.

17. Dag Hammarskjold medal

Context:

Naik Dhananjay Kumar Singh will be honoured posthumously with the Dag Hammarskjold medal during a solemn ceremony when the UN commemorates the International Day of United Nations Peacekeepers.

About Dag Hammarskjold medal:

- It was established in 1997 and it is the highest honour awarded to UN peacekeepers.
- It is a posthumous award given to members of peacekeeping operations who lost their lives during service with a peacekeeping operation under the operational control and authority of the United Nations.
- Each year on Peacekeeper's Day, this medal is awarded to any Member State who has lost one or more military or police peacekeepers at a ceremony at United Nations headquarters.
- It is named after the second Secretary-General of the United Nations, Dag Hammarskjold.

Other UN Awards:

- Captain Mbaye Diagne Medal for Exceptional Courage: It is awarded to those military, police, civilian United Nations personnel and associated personnel who demonstrate exceptional courage, in the face of extreme danger, while fulfilling the mandate of their missions or their functions, in the service of humanity and the United Nations.
- UN Military Gender Advocate of the Year Award: It was started in 2016 to recognise the dedication and effort of an individual peacekeeper in promoting the principles within the United Nations Security Council Resolution 1325.

India and UN Peacekeeping:

- India is the second largest contributor of uniformed personnel to UN Peacekeeping.
- It currently deploys more than 6,000 military and police personnel to the UN operations in Abyei, the Central African Republic, Cyprus, the Democratic Republic of the Congo, Lebanon, the Middle East, Somalia, South Sudan, and Western Sahara.

19. Colombo Process**About**

- India has become chair of regional grouping Colombo Process for the first time since its inception in 2003.
- ❓ Colombo Process is a Regional Consultative Process comprising 12 Member States of Asia (countries of origin of migrant workers).
- Member States: Afghanistan, Bangladesh, China, India,

Indonesia, Nepal, Pakistan, the Philippines, Sri Lanka, Thailand, Cambodia and Vietnam.

- It provides an important platform for consultations on the management of overseas employment and contractual labour.
- The Process is non-binding and decision-making is by consensus. ❓ The Process is governed by Ministerial Consultations wherein recommendations and action plans are discussed and adopted by the Ministers of the participating countries.



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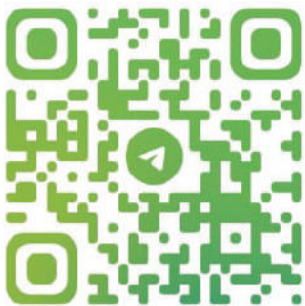
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ART AND CULTURE

1. Important Folk Paintings

Context:

Folk Painting	Associated State
1. Patachitra Painting	Odisha
2. Paitkar Painting	Jharkhand
3. Chittara paintings	Karnataka
4. Kalamezhuthu art	Kerala

Pattachitra: A traditional painting of

Odisha, the name Pattachitra comes from a Sanskrit word patta, which means canvas/cloth and Chitra means picture.

- The paintings show a mix of classical and folk elements, with a bias towards the latter. The base of the painting is treated cloth while the colours used come from natural sources including burnt coconut shells, Hingula, Ramaraja and lamp black.
- No pencil or charcoal is used, rather brush is used to draw the outlines in red or yellow after which the colours are filled.
- The themes of these paintings are inspired by the Jagannath and Vaishnava cults, sometimes from the Shakti and Shaiva cults. Pattachitra on palm leaf is known as talapattachitra.

Paitkar Painting: Practiced by the tribal people of Jharkhand. This old form of painting has cultural association with Ma Mansa, one of the most popular goddesses in tribal household.

- These paintings are linked to the social and religious customs including giving alms and holding yajnas.

- The common theme of Paitkar paintings is 'What happens to human life post death'. Although an ancient art, it is on the verge of extinction given the rate of its decline.

Chittara paintings

- **This folk craft is practised by the female members of the Delaware group in the Sagar district of Karnataka.** Yellow seeds and rice paste, two organic elements, were used to create it. Their homes, which are red mud hamlets, have murals on the walls and floors.
- Usually, these paintings depict scenes from the daily lives of tribal people, such as animals and birds, flowers used in pooja, rituals, gods, socioeconomic activities, gifts for children, etc.
- Natural resources like toasted rice, trees, vegetables, minerals, and rocks and stones provide them with their colour. Additionally, they paint with a delicate jute brush called a "Pundi."
- This traditional artwork is generally produced on auspicious occasions and has intricate themes and geometric designs.

Kalamezhuthu

- **Traditional Indian ritualistic art known as Kalamezhuthu is conducted at Kerala's temples and sacred woods.** For the blessings of gods and goddesses like Kali, Ayyappan, Bhadrakali, snake god, etc., it is practised as an offering. These deities' representations are painted on the ground using natural colours and powders.
- A typical recipe calls for five different coloured powders: white rice flour, black charcoal powder, yellow turmeric powder, green powdered green leaves, and red turmeric-lime powder.
- The picture first begins from the centre and is developed outwards by the artist, who uses just his bare hands to create it.

2. Buddha Jayanti Utsav

Context:

It is observed that the 2,568th Buddha Jayanti Utsav and Vaishakhi Buddha Purnima will be celebrated at Venuban Buddha Vihara in Kunjaban, Agartala.

Pilgrimage Sites in India

- **Bodh Gaya, Bihar: Where Buddha attained enlightenment.**
- **Sarnath, Uttar Pradesh: Where he delivered his first sermon.**
- **Rajgir, Bihar: Where he spent 12 years and convened the First Buddhist Council.**
- **Vaishali, Bihar: Where he gave his last sermon before Mahaparinirvana.**
- **Kushinagar, Uttar Pradesh: The site of his Mahaparinirvana.**

About the Buddha Jayanti Utsav

- It is a significant festival celebrated by Buddhists worldwide that commemorates the birth, enlightenment, and death of Siddhartha Gautama, who later became known as Gautama Buddha.

Date and Significance:

- Buddha Jayanti falls on the full moon day in the month of Vaisakha according to the Hindu lunar calendar.
- Birth of Gautama Buddha: According to Theravada Tripitaka, Gautama Buddha was born in Lumbini (now in Nepal) around 563 BCE.

Path to Enlightenment:

- **Four Sights:** At age 29, Siddhartha ventured outside the palace and encountered an elderly person, an ailing person, a corpse, and a serene ascetic.
- **Renunciation:** Moved by suffering, Siddhartha renounced his princely life, seeking answers to life's deeper questions.
- **Enlightenment:** Under the Bodhi tree in Bodh Gaya, Bihar, Siddhartha attained enlightenment, becoming Gautama Buddha.

Three Major Events on Vesak:

- **Birth:** Siddhartha was born on Vesak in Lumbini.
- **Enlightenment:** He attained enlightenment under the Bodhi tree on Vesak.
- **Passing Away:** Gautama Buddha passed away to nirvana in Kusinara on Vesak.

3. Virupaksha temple in Karnataka

Context:

A portion of the Virupaksha temple in Karnataka collapsed following torrential rains.

Historical Temples	Located in
1. Virupaksha Temple	Karnataka
2. Mundeshwari Temple	Bihar
3. Mukteshwara Temple	Odisha
4. Ramanathaswamy Temple	Tamil Nadu

Virupaksha temple:

- **Located in – Hampi, Karnataka.**
- **Establishment – Originally in 7th century, but it gained prominence in the 14th century during the Vijayanagara Empire.**
- It was constructed in Lakkana Dandesha's assistance who was a commander under King Deva Raya II.

- **Dravidian temple architecture** – 3 grand gopurams (towering gateways), the shikhara towering over the sanctum sanctorum, its intricate carvings and pillared halls.
- **Gopuram** – It depicts various deities, mythological scenes and animals as sculptures and carvings.
- **Sanctum sanctorum** – The Shiva lingam is the main deity.
- **Pavilions/ Saalu mantap** – Supported by stone pillars
- **Significance** – It is the oldest and principle temple in Hampi.
- A vital centre for the religious and cultural activities of its time.
- **Use of mathematical concepts** – The temple is triangular in shape & the repeated patterns depict the concept of fractals.
- **Destruction** – Hampi was ruined by the Bahmani sultanates during Vijanagara-Bahmani rivalry.
- The pillars' condition in the pavilion has deteriorated because of natural phenomena such as rain over a long period.
- **Key challenges** – Funding, logistics and human resources are lagging that slows the restoration work of the temple.
- **Recognition** – It belongs to the Group of Monuments at Hampi, declared as a UNESCO World Heritage Site.



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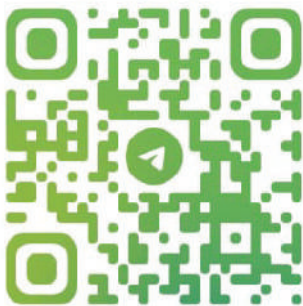
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MISCELLANEOUS

1. Booker Prize

Context:

The Booker Prize, one of the most prestigious awards in the literary world, has recently come under fire for the historical links to slavery of its original sponsor, Booker Group.

Booker Prize:

- The Booker Prize, is a prestigious literary award conferred each year for the best single work of sustained fiction written in the English language, which was published in the United Kingdom and/or Ireland. The Booker Prize was founded in 1969, initially just for writers from the Commonwealth, but later opened to writers globally.

• Past Indian recipients: Arundhati Roy (God of Small Things), Kiran Desai (Inheritance of Loss), Aravind Adiga (White Tiger).

International Booker Prize

- The International Booker Prize is awarded for a work of fiction translated into English and published in the United Kingdom or Ireland.
- It was instituted in 2004.
- In 2022 Geetanjali Shree for her Hindi novel, Tomb of Sand received the prize.

2. World Press Freedom Index

Context:

India's press freedom score falls in the 2024 World Press Freedom Index.

World Press Freedom Index 2024

- It is an annual index of freedom enjoyed by journalists in 180 jurisdictions.
- Press freedom is defined as the ability of journalists as individuals and collectives to select, produce & disseminate news in the public interest independent of political, economic, legal, and social interference

and in the absence of threats to their physical and mental safety.

- Released by - Reporters sans Frontieres (Reporters without Borders), a global media watchdog headquartered in Paris, France.

- It has consultative status with the United Nations and the UNESCO.

- Analysis – It is assessed globally and also regionally like Africa, Americas, Asia – Pacific, Europe - Central Asia and Middle East - North Africa.

Score

- '0' - For the worst possible performance.
- '100' - The best possible score.

2 Indicators – A tally of abuses against media and journalists in connection with their work.

A qualitative analysis of the situation in each country or territory based on the responses of “press freedom specialists” to an RSF questionnaire available in 24 languages.

5 categories RSF questionnaire – Political context, legal framework, economic context, sociocultural context and security. **Findings of the 2024 report – Press freedom around the world fell by an average 7.6 points globally and is being threatened by the very people who should be its guarantors, the political authorities.**

Topper – Norway and Denmark topped.

Worst performers – Eritrea was at the bottom, with Syria just ahead of it.

India – Its rank improved from 161 in 2023 to 159 in 2024 only because other countries had slipped in their rankings. Scores dropped in all 4 categories of questionnaire except the security indicator, thus overall score fell from 36.62 to 31.28.

3. Border Roads Organisation

Context:

The Border Roads Organisation (BRO) celebrated its 65th Raising Day. About Border Roads Organisation (BRO):

- It was raised with just two projects in 1960 – Project Tusker (now Vartak) in the East and Project Beacon in the North.
- In order to ensure coordination and expeditious execution of projects, the Government of India set up the Border Roads Development Board (BRDB) with the Prime Minister as Chairman of the Board and Defence Minister as Deputy Chairman.

- The BRO has today become a vibrant organisation with 18 projects operating in 11 States and three Union Territories.
- Officers and personnel from the General Reserve Engineer Force (GREF) form the parent cadre of the BRO.
- The BRO executes road construction and maintenance works at altitude ranging from 9,000 ft up to 19,000 ft along the Northern and Western frontiers, primarily to meet the strategic requirements of the Armed Forces.
- The BRO has been at the forefront of promoting gender equality and inclusivity, offering key roles and opportunities to women. Officers like Col Ponung Doming are leading critical projects in Eastern Ladakh.

Recent and upcoming Projects: In 2023-24, the BRO completed a total of 125 infrastructure projects worth Rs 3,611 crore.

- This includes the construction of Sela Tunnel in Arunachal Pradesh on Balipara-Chardwar-Tawang Road.
- The BRO will soon commence the construction of the 4.10-km long Shinkun La Tunnel. Once completed, this tunnel will become the world's highest tunnel at 15,800 ft by passing Mila Tunnel in China at 15,590 ft.



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4. World Migration Report, 2024

Context:

The World Migration Report, 2024 was recently released by the International Organisation for Migration (IOM).

About:

- The World Migration Report is released by the International Organisation for Migration (IOM).
- Since 2000, IOM has been producing its flagship world migration reports every two years.
- India received over USD 111 billion in remittances in 2022, the largest in the world, becoming the first country to reach and surpass the USD 100 billion mark.

The top five remittance recipient countries in 2022 are:

1. India
2. Mexico
3. China
4. Philippines
5. France

- According to the report's data, India was the top country receiving remittances in 2010 (USD 53.48 billion), 2015 (USD 68.91 billion), and 2020 (USD 83.15 billion).

- India came in 13th as the destination country for immigrants.

Key findings of the report – Very large number of migrant workers from the subregion, Southern Asia receives some of the largest inflows of remittances globally.

- Three countries in Southern Asia (India, Pakistan and Bangladesh) rank among the top ten recipients of international remittances in the world.
- The Gulf States remain significant destinations for migrant workers from around the world.

- In the United Arab Emirates, Kuwait and Qatar, migrants made up 88 %, nearly 73 and 77 % of the national populations, respectively.
- Most migrants work in sectors such as construction, hospitality, security, domestic work and retail.
- **India's large Diasporas live in countries such as the United Arab Emirates, the United States and Saudi Arabia.**
- The contraction of remittance flows to China includes demographic shifts (shrinking of the working age population) and zero-COVID policy.
- Countries in Asia are the origins of the largest number of internationally mobile students in the world.
- **The US is the largest destination country for international mobile students in the world, followed by the UK, Australia, Germany and Canada.**
- The report said that there are more female than male international migrants in destination countries in Europe and Northern America, such as the US, Canada, France, Spain and Italy, but also in India.
- Loss of jobs along with wage theft and lack of social security during the pandemic has plunged many Indian migrants into deep debt and insecurity.

5. Batagaika Crater

Context:

According to a new study, a huge crater in Siberia's permafrost is growing by 35 million cubic feet every year as the frozen ground melts.

About Batagaika Crater:

- **It is also called the "gateway to the underworld," by some locals in Russia's Sakha Republic.**
- **Location: It is located in Russia's Far East that forms the world's biggest permafrost crater.**
- It is a crater or mega slump, features a rounded cliff face that was first spotted on satellite images in 1991 after a section of hillside collapsed in the Yana Uplands of northern Yakutia in Russia.

- Scientists believe that the crater is the result of a melting permafrost land, which was frozen during the Quaternary Ice Age 2.58 million years ago.

6. UN Counter-Terrorism Trust Fund

Context:

Recently, India contributed \$5,00,000 to UN Counter-Terrorism Trust Fund, reaffirming unwavering commitment to global fight against terrorism. About United Nations Counter-Terrorism Trust Fund:

- **It was established in 2009 and transferred to UN Office of Counter- Terrorism (UNOCT) in 2017.**
- **Who can contribute? The Fund accepts contributions from Governments, inter-governmental and non-governmental organizations, private institutions and individuals.**
- Contributions may be unearmarked or earmarked for one of UNOCT's global programmes or specific initiatives.
- India's contribution would support UNOCT's global programmes — mainly Countering Financing of Terrorism (CFT) and Countering Terrorist Travel Programme (CTTP).
- They are aimed at building capacities of the member states of eastern and southern Africa to combat the critical issues of financing of terrorism and prevent the movement and travel of terrorists.

7. Vibrant Village Programme

Context:

The Home Ministry recently sanctioned 113 roads under the Vibrant Village Programme in Arunachal Pradesh, Uttarakhand, and Sikkim to improve connectivity in areas along the border.

About Vibrant Village Programme:

It is a Centrally Sponsored Scheme implemented over the financial years 2022-23 to 2025-26.

Objective:

- Comprehensive development of villages and blocks on the northern border, thus improving the quality of life of people living in identified border villages.
 - This will help in encouraging people to stay in their native locations in border areas and reversing the outmigration from these villages, adding to improved security of the border.
 - **The programme will provide funds for the development of essential infrastructure and the creation of livelihood opportunities in 2967 villages in 19 Districts and 46 Border blocks of 4 states and 1 UT along the northern land border of the country: Arunachal Pradesh, Sikkim, Uttarakhand, Himachal Pradesh, and the UT of Ladakh.**
 - The programme envisages focused areas of intervention in the select villages for the creation of opportunities for livelihood generation through promotion of tourism and cultural heritage, skill development and entrepreneurship, and development of cooperative societies, including agriculture/horticulture, cultivation of medicinal plants/herbs etc.
 - Interventions also include providing road connectivity to unconnected villages, housing and village infrastructures, energy including renewable energy, television and telecom connectivity.
- Vibrant Village Action Plans will be created by the district administration with the help of Gram Panchayats, and 100 % saturation of Central and state schemes will be ensured.
- **There will be no overlap with the Border Area Development Programme.**

8. Memory of the World**Context:**

Memory of the World (MOW) Regional Register inscribes 20 new items in recognition of human innovation and imagination in Asia-Pacific.

Memory of the World (MOW)

• **Launched by - United Nations Educational, Scientific and Cultural Organization (UNESCO), in 1995**

• **Objectives – Facilitate preservation of the world's documentary heritage, particularly in areas affected by conflict and/or natural disaster.**

- Enable universal access to documentary heritage worldwide.
- Enhance public awareness about the significant of documentary heritage among the wider public. ☑ Total inclusion – 496.

Memory of the World Asia-Pacific Regional Register:
☑ **MOWCAP – The Memory of the World Asia-Pacific Committee.**

MOWCAP Regional Register – A listing of those “documentary heritage of influence” in the Asia/Pacific region approved for inclusion by MOWCAP.

- Successful nominations to MOWCAP are entered on the Asia/Pacific Regional Register.
- **Call for nominations and inscriptions – It is made every 2 years unless unexpected circumstances make this impractical.**
- Nominations will normally be called for in the even-number years (to alternate with the International Register).
- **Approval – After recommendations from the Register Subcommittee (RSC), and voting by member state representatives.**
- **UllanBatar convention – General meeting of MOWCAP held in Ulaanbaatar, Mongolia in 2024, which celebrates Asia-Pacific achievements in geneology, literature, and science, among others.**
- It saw the inclusions from Australia & Tuvalu – Funafuti, Indonesia, India, China, Bangladesh, Malaysia, Mongolia, Philippines, Vietnam and Uzbekistan.

India's 3 items in MOW

- The Illustrated Manuscripts of Rāmacaritamānasa of Tulasīdāsa
- The Manuscript of the SahṛdayālokaLocana: Seminal Text of Indian Poetics, authored by Acharya Anandvardhan.
- The 15th Century Manuscript of the Pañcatantra Fables - authored by Acharya Anandvardhan, Pt. Vishnu Sharma

The Indira Gandhi National Centre for the Arts (IGNCA) advocated for 3 Indian nominations in Memory of the World AsiaPacific Regional Register at the 10th General meeting of MOWCAP held in 2024.

Significance to India – **It is the 1st time IGNCA has submitted nominations to the Regional Register since its inception in 2008.**

9. Doppler Radar**Context:**

The Consumer Affairs Ministry has announced a call for public comments on proposed new regulations for microwave doppler radar equipment used to measure vehicle speeds on roads.

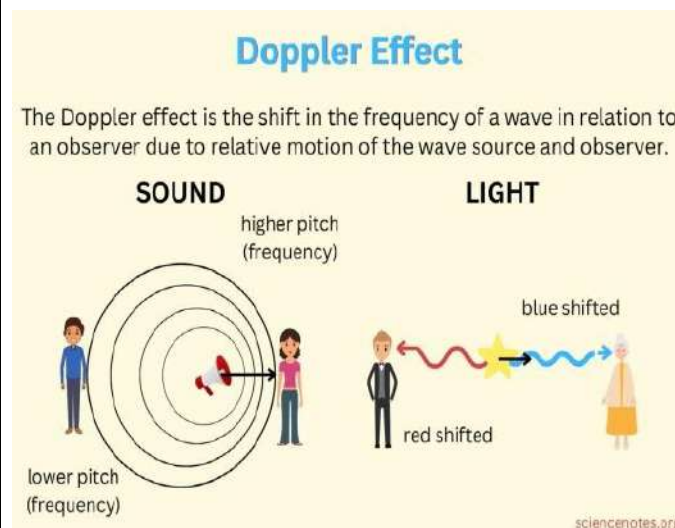
About Draft Regulations:

- These draft regulations mandate that any radar speed equipment installed after the finalization of the rules must undergo verification and receive official stamping within one year. The aim is to ensure the accuracy and reliability of speed measurements, which are often used in legal proceedings related to traffic violations.

Doppler Radar:

- **Doppler radar is a type of radar system that uses the Doppler effect to measure the velocity of objects, such as precipitation particles or aircraft.**
- It works by emitting radio waves and then detecting the frequency shift of the waves that are reflected back from moving objects. This frequency shift, known as the Doppler shift, is proportional to the velocity of the objects relative to the radar.

- This phenomenon is observed in sound waves and electromagnetic waves. Doppler radar finds applications in meteorology and vehicle speed monitoring by law enforcement.

**10. Copernicus Programme****Context:**

Soon after Iranian President Ebrahim

Raisi's helicopter crashed, the European Union (EU) activated its rapid satellite mapping service to help search efforts, following a request for assistance from Iran. The rapid mapping service is one of the crucial components of the Emergency Management Service (EMS), which comes under the EU's Copernicus programme.

About Copernicus Programme:

- **Part of the EU's space programme aimed at Earth and environmental monitoring.** Initial Name: Launched in 1998 as Global Monitoring for Environmental Security (GMES).
- **Implementation:** By the European Commission (EC) with support from the European Space Agency (ESA) and the European Environment Agency (EEA).
- **The Copernicus programme aims to monitor the Earth and its environment by collecting data from a constellation of satellites called Sentinels, as well as from contributing missions and non-space sources.**

11. Project Udbhav

Context:

Recently Army Chief has revealed that The Indian Army, under its initiative Project Udbhav, is delving into the epic battles of the Mahabharata and the strategic brilliance of past Indian dynasties.

Project Udbhav:

- Project Udbhav is an initiative by the Indian Army to rediscover and integrate India's rich military heritage into contemporary military practices.
- Project Goal – To revisit the roots of India's military thinking and integrate ancient wisdom with contemporary practices.
- It has explored ancient texts such as Vedas, Puranas, Upanishads, and Arthashastra.

Significance –

- Understand and leverage the vast knowledge from India's 5000-year-old civilization.
- Develop a unique approach to modern security challenges.
- Strengthen the Indian Army's future preparedness.

Examples of Ancient Military Wisdom:

- Arthashastra by Chanakya emphasizes strategic partnerships and ethical conduct in warfare.
- Naval Battle of Saraighat (1671) showcases clever tactics and exploiting enemy weaknesses.
- Chhatrapati Shivaji's use of guerilla warfare and naval forts for defense.

12. Agnipath scheme

Context:

The Army is conducting an internal survey on the Agnipath scheme to assess its impact on its recruitment process so far, based on which it is likely to draw up recommendations for possible changes to the scheme.

About:

- Introduced in 2022, the Agnipath scheme — also called the Tour of Duty scheme is a short-term recruitment scheme for the Indian Army.
- Under the policy, soldiers — called 'Agniveers' — are recruited for four years, at the end of which only 25 percent of recruits from a batch are retained for regular service.
- Age Limit: Candidates between the age of 17.5 years to 21 years will be eligible for enrolling in the Agnipath scheme.
- The scheme provides an avenue to Indian youth, desirous of serving the country to get recruited in the Armed Forces for a short duration.
- The scheme enhances the youth profile of the Armed Forces.

13. Joint Exercises of the Indian Air Force

Context:

The Indian Air Force (IAF) has joined a 16day multi-nation mega military exercise in Alaska.

<i>Joint Exercises of the Indian Air Force</i>	<i>Associated countries</i>
1. Exercise Red Flag	India-USA
2. Exercise Desert Eagle	India-UAE
3. Exercise Indradhanush	India-UK
4. Exercise Eastern Bridge	India-Oman

About Exercise Red Flag

- **Exercise Red Flag is a premier international aerial combat training event hosted by the United States Air Force.**
- It is held several times a year and brings together air forces from around the world to engage in advanced aerial combat training.
- **India's participation in Exercise Red Flag signifies the strengthening of the US-India strategic partnership. The exercise allows both nations to share expertise, test tactics, and enhance interoperability.**



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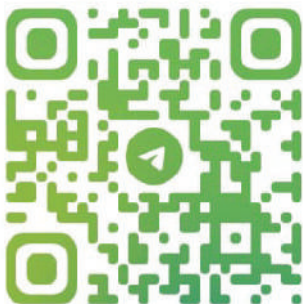
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4	CA July 2024	29-09-2024
5	CA August 2024	13-10-2024
6	CA September 2024	27-10-2024
7	CA October 2024	17-11-2024
8	CA November 2024	15-12-2024
9	CA December 2024	12-01-2025
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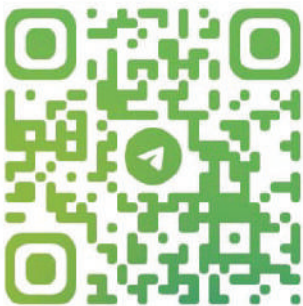
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