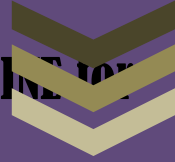


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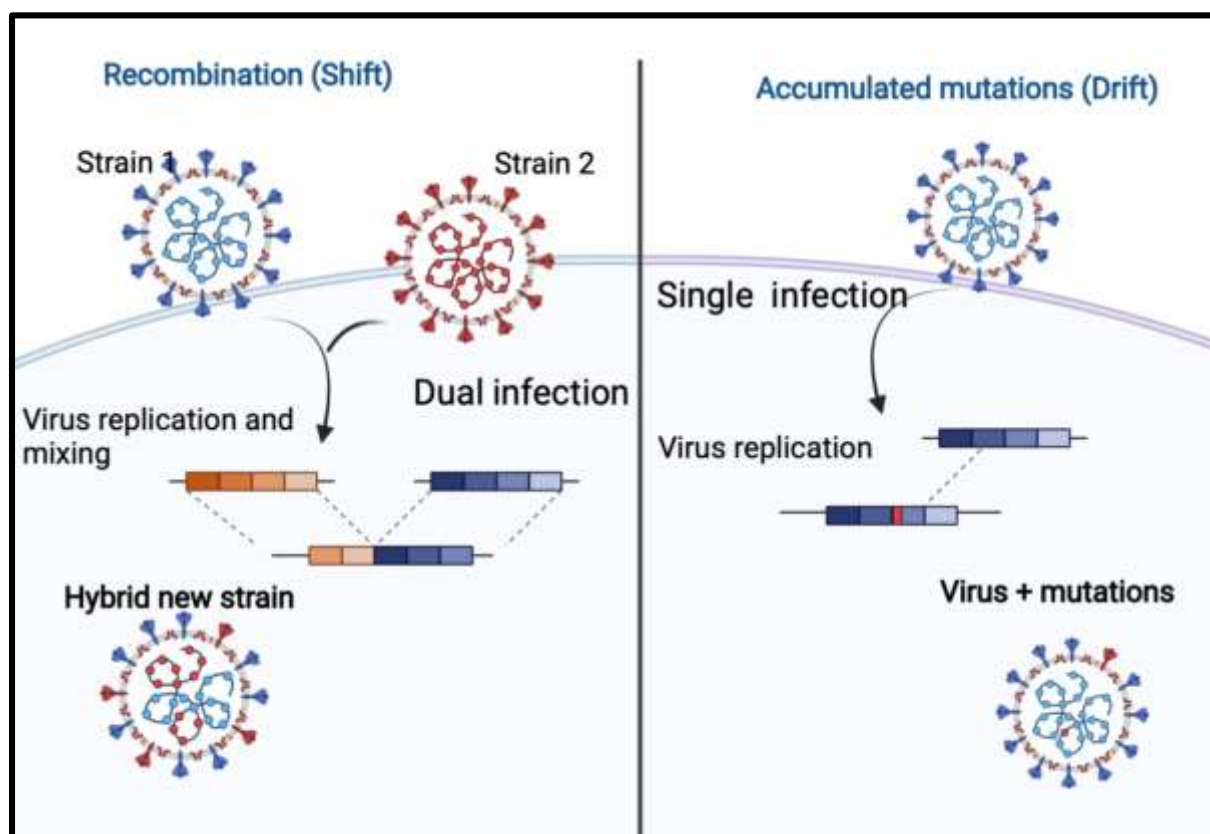
Success is born of action...

Topic 1. RECOMBINANT VIRUS

(PUNE/THANE/DADAR/ANDHERI)

OFFLINE/ONLINE LIVE LECTURES

Importance for Prelims: Science



The recombination of the novel coronavirus lineages is unlikely to be a greater threat to public health than mutations.

How are variants created?

- SARS-CoV-2, the virus that causes COVID-19, is an RNA virus which evolves by accumulating genetic errors in its genome.
- These errors are produced when the virus infects a person and makes copies of itself inside the host's cells.
- These errors (otherwise known as mutations) are thus a by-product of replication of SARS-CoV-2 inside the cell and will be carried forward because the virus continues to infect people.
- when viruses having a specific set of errors or mutations infect a number of people, this forms a cluster of infections descending from a common parental virus genome and is thought as a lineage or a variant of the virus.

What is Mutation?

- A mutation means that a change in the genetic sequence of the virus. in the case of SARS-CoV-2, which is an ribonucleic acid (RNA) virus, a mutation means that a change in the sequence during which its molecules are arranged.
- RNA is an important biological macromolecule that is present in all biological cells, Principally involved in the synthesis of proteins, carrying the messenger instructions from Deoxyribonucleic Acid (DNA), which is an organic chemical that contains genetic info and instructions for protein synthesis.
- It is found in most cells of every organism.
- A mutation in an ribonucleic acid virus typically happens when the virus makes a mistake whereas it's making copies of itself.
- Mutations are a natural phenomenon when the viruses replicate.
- Usually, ribonucleic acid viruses have a higher rate of mutations compared with deoxyribonucleic acid viruses.
- However, unlike other RNA viruses, coronaviruses have fewer mutations.
- This can be because coronaviruses have a genetic “proofreading mechanism” that corrects some of the errors made throughout replication.

What is a recombinant variant?

- Recombination occurs when, in extremely rare situations, two different lineages of the virus co-infect the same cell in the host and exchange fragments of their individual genomes which generate a descendent variant having mutations that the occurred in both the original lineages of the virus.
- Recombination of lineages happens in a very variety of other viruses, as well as those who cause influenza, as well as other coronaviruses.
- Such recombination events occur generally in situations wherever 2 or more lineages of SARS-CoV-2 may be co-circulating in a certain region throughout the same time period.

- This co-circulation of lineages provides an opportunity for recombination to occur between these 2 lineages of SARS-CoV-2.

Are recombinant variants more deadly?

- Although recombination has been detected in SARS-CoV-2, it has not yet impacted public health in a unique way.
- There is little evidence to suggest that recombinant lineages have a varied clinical outcome compared to the currently dominant Omicron variant, although preliminary data from the U.K. health security agency suggests a transmission advantage over the omicron variant.
- It's certain at this point in time that more Information will be needed to ascertain the impact of those lineages on the epidemiology of COVID-19.
- When there is multiple lineages circulating, the danger is that the viruses could combine one dangerous phenotype with another dangerous phenotype into a single virus that has two dangerous phenotypes

Topic 2. SC UPHOLDS NEW RESTRICTIONS ON RECEIVING FOREIGN FUNDS

Importance for Prelims: Polity

The Supreme Court upheld amendments introducing restrictions in the Foreign Contribution Regulation Act (FCRA) while holding that no one has a fundamental or absolute right to receive foreign contributions.

- **Observation of Court:** No one can be heard to claim a vested right to accept foreign donations, much less an absolute right.
- Philosophically, foreign contribution (donation) is akin to gratifying intoxicant replete with medicinal properties and may work like a nectar.
- However, it serves as a medication so long because it is consumed (utilised) moderately and discreetly, for serving the larger cause of humanity.
- The presence/inflow of foreign contribution in the country ought to be at the minimum level, if not completely eschewed.
- The influence might manifest in different ways that, including in destabilising the social order within the country.
- Unbridled inflow may destabilise sovereignty of the nation Unregulated inflow of foreign donations would only indicate that the government was incapable of looking after its own affairs and needs of its citizens
- • The amendments don't prohibit inflow of foreign contributions, however are a regulatory measure to permit acceptance by registered persons or persons having prior permission to try to do so with condition that they must themselves utilise the entire contribution
- The court held that the restrictions in the amendments were “reasonable” and “founded on intelligible criteria”.
- It fixed accountability on the recipients, increased the efficacy of “continual supervision” over foreign contributions, did not discriminate and served the purpose of the FCRA 2010.
- Mere plea of inconvenience is not enough to attract constitutional inhibition.

- There's intrinsic evidence to indicate that the change effected by the amendments is to serve the legitimate government purpose and has a rational nexus to the object of the principal Act of 2010 Foreign Contribution (Regulation) Amendment, 2020: It seeks to prohibit 'public servants' from receiving any foreign funding.
- It proposes to reduce the use of foreign funds to meet administrative costs by NGOs from the existing 50 per cent to 20 per cent.
- It seeks to "prohibit any transfer of foreign contribution to any association/person".
- It proposes to make Aadhaar cards a mandatory identification document for all the office-bearers, directors and other key functionaries of NGOs or associations eligible to receive the foreign donations.
- Another amendment mandates that every person (or association) granted a certificate or prior permission to receive overseas funds must open an FCRA bank account in a designated branch of the SBI in New Delhi.
- It seeks to allow for the central government to hold a summary inquiry to direct bodies with FCRA approval to "not utilise the unutilised foreign contribution or receive the remaining portion of foreign contribution".
- **Foreign Contribution (Regulation) Act (FCRA), 2010:** Under the Act, organisations require to register themselves every five years.
- As per the amended FCRA rules, all NGOs registered or granted prior permission under FCRA are currently required to upload details of foreign contributions received and utilised by them every 3 months on their web site or the FCRA web site.
- NGOs currently need to file their annual returns online, with the hard copy version dispensed with.

Topic 3. 10 STATES GET NOD TO BORROW ₹28,204 CRORE

Importance for Prelims: Polity

Move based on fifteenth Finance Commission recommendations following power sector reforms by States.

- Finance Ministry, based on the recommendations of the 15th Finance Commission, had decided to grant the additional borrowing space of up to 0.5 per cent of the Gross State Domestic Product (GSDP) to the States every year for four years from the FY22 to FY25 based on reforms undertaken by them in the power sector.
- This was announced by the minister of finance in the Budget speech for FY22.
- The Power Ministry is the nodal agency for assessment of the performance of States and determining their eligibility for granting additional borrowing permission.
- To avail of the additional borrowing, the States have to undertake a set of the mandatory reforms and also meet stipulated performance benchmarks.
- The reforms include assuming responsibility for losses of Discoms, transparent reporting of power sector finances, as well as payment of subsidies as well as the recording of liabilities of governments to Discoms.
- It also includes timely rendition of the financial and the energy accounts, and it's timely audit.
- States who could not complete the reform process in FY22 may also avail of the benefit for FY23 if they carry out the reforms in the current financial year.
- Borrowing by States article-293

Topic 4. FORTIFIED RICE

Importance for Prelims:Economy

WHAT IS FORTIFIED RICE?

Fortification is the practice of deliberately increasing the content of an essential micronutrient, i.e. vitamins and minerals (including trace elements) in food to improve its nutritional quality and provide a public health benefit with minimal risk to health



➤ The fortification factor does not last for more than **45 days**, so it isn't advisable to store fortified rice for long

➤ According to National Family Health Survey, **78.7%** children and **75%** in the district are anaemic and suffer from malnutrition

➤ In the first phase, fortified rice will be distributed in Badangi, Bobbili, Ramabhadrapuram and Terlam mandals

The Union cabinet approved a scheme to distribute fortified rice under government programmes like NFSA, ICDS, PM POSHAN and others.

- In last year's independence day speech, PM had announced the fortification of rice distributed under various government schemes, as well as the general public distribution system (PDS) and midday meals in schools, by 2024.
- FCI and state agencies have already procured 88.65 LMT (lakh tonnes) of fortified rice for supply and distribution.
- But, around 35 million tonne (mt) of fortified rice is required for supply grain to beneficiaries of NFSA, ICDS, PM POSHAN and other schemes annually with an estimated cost of Rs 2,700 crore.

- In the 1st phase that ended in March 2022, fortified rice was supplied to beneficiaries of ICDS and PM POSHAN beneficiaries across eleven states — Andhra Pradesh, Gujarat, Maharashtra, Tamil Nadu, Chhattisgarh, Uttar Pradesh, Odisha, Telangana, Madhya Pradesh, Uttarakhand and Jharkhand.
- In the second phase of implementation, along with the beneficiaries under ICDS and PM POSHAN, fortified rice will be provided under NFSA and other welfare schemes to 291 aspirational and high burden districts assessed in the terms of stunting by March 2023.
- The decision on providing fortified rice comes after the govt decided to extend the free ration scheme — Pradhan Mantri Garib Kalyan Anna Yojana (PMGKAY) — by six months to September-end 2022.
- **Need for fortified rice:** To combat anaemia and Malnutrition among women, lactating mothers and children.
- Also, Rice is one of India's staple foods, consumed by about two-thirds of the population (Per capita rice consumption in India is 6.8 kg per month).
- Therefore, fortifying rice with micronutrients is an option to supplement the diet of the poor.
- **India's capacity for fortification:** Last year, nearly 2,700 rice mills had installed blending units for production of fortified rice, and India's blending capacity stood at 13.67 lakh tonnes in 14 key states.
- FRK production had increased rapidly from 7,250 tonnes to 60,000 tonnes within 2 years.
- **Technologies involved in Rice Fortification:** Various technologies are available to add micronutrients to regular rice, such as coating, dusting, and extrusion.
- Extrusion involves in the production of the fortified rice kernels (FRKs) from a mixture using an 'extruder' machine.

- It is considered to be the best technology for India.
- FRKs have a shelf life of at least 12 months.
- The fortified rice kernels are blended with regular rice to produce fortified rice.
- As per guidelines issued by the Ministry of consumer Affairs, Food and Public Distribution, the shape and size of the fortified rice kernel should “resemble the normal milled rice as closely as possible”.
- According to the guidelines, the length and breadth of the grain should be five mm and 2.2 mm Standards for Fortification: ten g of FRK should be blended with 1 kg of regular rice.
- Cooking Procedure: No special effort needed.
- The rice needs to be cleaned and washed in the normal way before cooking.
- After cooking, fortified rice retains the same physical properties and micronutrient levels because it had before cooked.
- **Way to distinguish between fortified rice and regular rice:** Fortified rice will be packed in jute bags with the logo (‘+F’) and the line “Fortified with Iron, Folic Acid, and Vitamin B12”.

Topic 5. SURGE IN MARINE PRODUCT EXPORTS

Importance for Prelims:Economy

India’s marine products exports reached a record high of \$7.74 billion during 2021-22, achieving the 99% of the \$7.809-billion target fixed by the Commerce Ministry for 2021-22.

- The US, China and Japan are the top three favourite destinations for Indian marine exports.
- Exports contributed to those 3 countries account sixty three per cent of exports in dollar terms.
- The top 10 countries were the US (past 11 years), China (past 3 years), Japan (past 3 years), Vietnam, Thailand, Spain, Canada, Italy, UAE and Belgium.
- Among them, the {top|the highest} 5 countries contributed seventy per cent of exports and also the top ten countries contributed eighty two per cent of total marine exports in dollar value.
- The export target fixed for these top three countries are usually achieved at higher value than the pre-fixed one.
- According to MPEDA (Marine products Exports Development Authority), Russia Ukraine conflict hit seafood shipments to CIS countries in the last quarter.
- Otherwise, the export figure could have crossed the target fixed by the Ministry.
- Besides, the pent-up demand from various countries is also a contributing factor for India to perform well in the world market.
- South-East Asian nations are the main source for these countries to procure seafood.
- However the rising Covid cases had restricted exports and affected production.
- This has facilitated these countries to source the seafood from India.
- **Major items of Export:** Frozen Shrimp emerged as a principal item of export in the seafood basket both in quantity and foreign earnings followed by Frozen Fish, Frozen Cuttle fish, others and Frozen Squid etc.

- **MPEDA:** The Marine Products Export Development Authority (MPEDA) is a statutory body which was set up under Section (4) of MPEDA Act, 1972.
- It is functions under the Department of Commerce.
- It is responsible for development of the marine products industry with special reference to exports.
- It is headed by a Chairman.
- It's its headquarters at Kochi and has a number of Regional and Sub-Regional Offices.

Topic 6. DEREGULATION OF GM CROPS

Importance for Prelims:Economy

Anil Ghanwat, President of Swatantra Bharat Party and a member of the Supreme Court-appointed Committee on Farm Laws demanded the government must deregulate all GM Crops and varieties that have been approved in other developed countries.

- **In News:** As many states are reluctant in giving consent for field trials of gm crops, the govt should deregulate Bt brinjal and gm mustard, that have been already approved by the GEAC also because the herbicide tolerant varieties of cotton and other crops.
- The decision will make India self-sufficient in oilseeds and pulses which are being imported.
- Moreover, permitting the adoption of this technology in India can give freedom to farmers to sow the seed they prefer and also the technology they need to adopt.
- **GM Crops:** In conventional plant breeding, species of same genus are crossed to provide the offspring with the desired traits of both parents.
- Genetic engineering aims to transcend the genus barrier by introducing an alien gene in the seeds to get the desired effects.
- The alien gene could be from a plant, an animal or even also a soil bacterium.
- Bt cotton is the only GM crop allowed for commercial cultivation in India.
- It's 2 alien genes from the soil bacterium bacillus thuringiensis (Bt) that allows the crop to develop a protein toxic to the common pest pink bollworm.
- HtBt, on the other, cotton is derived with the insertion of an additional gene, from another soil bacterium, which allows the plant to resist the common herbicide glyphosate.
- **Legal Provision:** Use of the unapproved GM variant can attract a jail term of 5 years and fine of Rs 1 lakh under the Environmental Protection Act ,1989.
- **GEAC:** The Genetic Engineering Appraisal Committee (GEAC) functions under the Ministry of Environment, Forest and Climate Change (MoEF&CC).

- it's responsible for appraisal of activities involving large scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.
- The committee is also responsible for appraisal of proposals relating to release of genetically engineered (GE) organisms and products into the environment including experimental field trials.
- GEAC is chaired by the Special Secretary/Additional Secretary of the MoEF&CC and co-chaired by a representative from the Department of Biotechnology (DBT).
- Presently, it's twenty four members and meets each month to review the applications in the areas indicated above.

Topic 7. SPACEX'S LAUNCH OF THREE VISITORS TO ISS

Importance for Prelims: Science and Technology

SpaceX launched 3 rich businessmen and their astronaut escort to the International space station for more than a week's stay, as National Aeronautics and Space Administration joins Russia in hosting guests at the world's most expensive tourist destination. Background: Russia has been hosting tourists at the space station – and before that the Mir station – for decades. Just last autumn, a

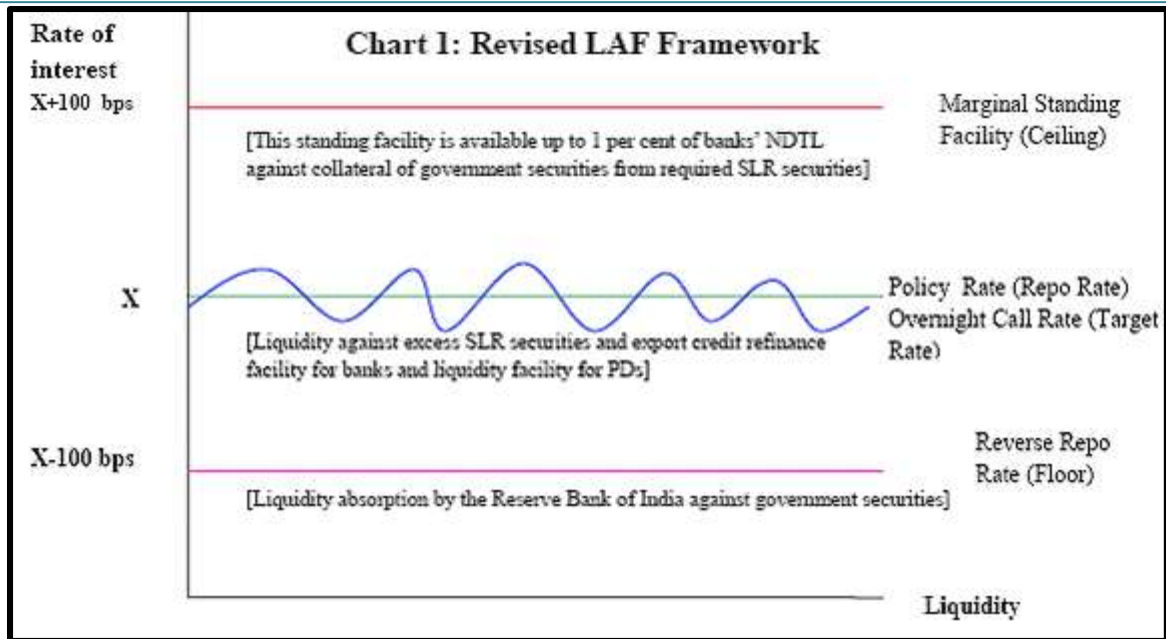
Russian movie crew flew up and followed by a Japanese fashion tycoon and his assistant. National Aeronautics and Space Administration is finally getting into the act, after years of opposing space station visitors.

- It's SpaceX's second private charter flight to the orbiting lab after two years of carrying astronauts there for NASA.
- The first private charter of Elon Musk's SpaceX, took a billionaire and his guests on a three-day orbit ride last year.
- The private Axiom space company arranged this visit with National Aeronautics and Space Administration for its 3 paying customers.
- So, this may be considered as Axiom's first private flight to the space station.
- The three visitors will be an American, Canadian and Israeli who run investment, real estate and other companies.
- They're paying \$55 million apiece for the rocket ride and the accommodations, all meals included.
- The visitors' tickets include access to all however the Russian portion of the space station – they'll need permission from the 3 cosmonauts on board.
- Three Americans and a German also live up there.
- **Other Explorations include:** Jeff Bezos' rocket company Blue Origin is taking customers on 10-minute rides to the edge of space, while Virgin Galactic expects to start flying customers on its rocket ship later this year.
- Axiom is targeting next year for the second private flight to the space station.
- More customer trips can follow, with Axiom adding its own rooms to the orbiting complex beginning in 2024.
- After about 5 years, the company plans to detach its compartments to form a self-sustaining station – one of many commercial outposts intended to replace the space station once it's retired and NASA shifts to the moon.

- NASA's new moon rocket, which is awaiting completion of a dress rehearsal for a summertime test flight.

Topic 8. LIQUIDITY ADJUSTMENT CORRIDOR

Importance for Prelims:Economy



The Reserve Bank of India (RBI) has introduced a non-collateralized Standing Deposit Facility (SDF) to absorb surplus liquidity from the banking system at a higher interest rate.

RBI will now use SDF at 3.75% as the floor rate for Liquidity Adjustment Facility (LAF) corridor instead of Fixed Reverse Repo Rate at 3.35%

What?

- SDF is a Reverse Repo Facility at a higher rate and without collaterals from RBI.
- Under SDF banks will be able to park their surplus money (lend to the RBI) however at a higher rate than reverse repo rate.

Why?

- SDF rate of 3.75 per cent are going to be the new floor rate for the Liquidity Adjustment Facility (LAF) corridor, replacing the fixed rate reverse repo.
- So far, RBI used three policy rates under the LAF corridor to manage its monetary policy operations: repo rate- at which it lends to banks, reverse repo rate- at that it drains excess liquidity from banks, marginal standing facility-rate at which Reserve Bank of India supplies liquidity on overnight basis (above the repo rate).

- It acted as the ceiling rate under the LAF corridor.
- Introduction of the SDF thus acts because the floor rate under the LAF corridor as being above the fixed reverse repo rate.
- This has resulted in normalisation of the LAF corridor to pre-pandemic level of 50 basis points, with SDF being 25 basis points below the repo rate and the marginal standing facility (MSF) twenty five basis points above the repo rate.
- And it can be seen because the 1st concrete step for each policy and liquidity normalisation.
- significant change in the design of LAF itself.
- **Changes in details:** The policy repo (4%) and reverse repo rates (3.35%), both of which are collateralised overnight rates, used to be the upper and lower bounds respectively of the LAF corridor till now.
- These will be replaced by two standing facility rates — MSF or Marginal Standing Facility (4.25 per cent) and SDF or Standing Deposit Facility (3.75 per cent) as being lower than Repo Rate and the above Reverse Repo Rate respectively.
- **Advantages:** Remove constraints on liquidity absorption mechanism— Since RBI can get money without parting Gsec as the collateral to the lenders as done under reverse repo facility. Benefits to Banks through arbitrage— the market repo rate was around 3.40 per cent and, with SDF at 3.75, banks with excess SLR (Statutory Liquidity Ratio) can borrow through market repo/TREPS at lower rates, and also the amounts so borrowed will be parked with the Reserve Bank of India at higher SDF which might not attract capital charge, for engaging in arbitrage in preference to making loans which attract capital charge.

Topic 9. SLR UNDER THE HELD TO MATURITY (HTM) CATEGORY

Importance for Prelims:Economy

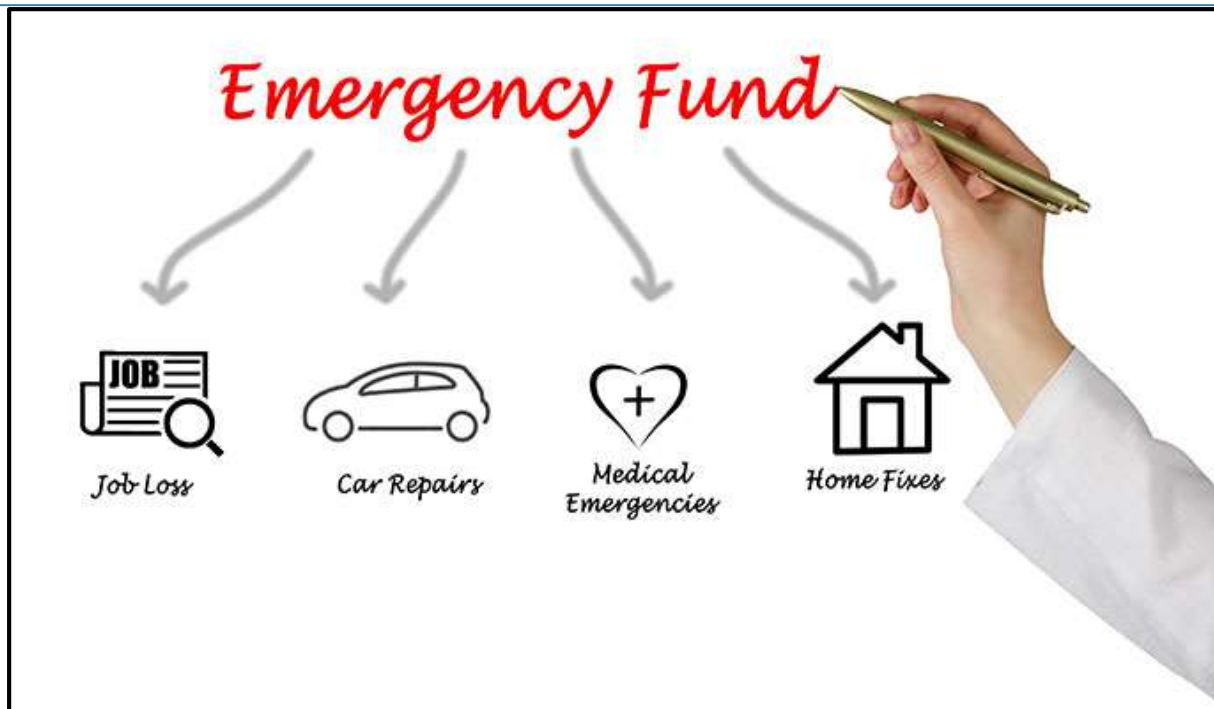
The reserve bank of India (RBI) has increased the limit for banks to park Statutory Liquidity ratio (SLR) securities like Government Securities (G-Secs) in the control to Maturity (HTM) category from 22 to 23% of NDTL or Net Demand and Time Liabilities, in the backdrop of the huge ₹14.31-lakh crore government borrowing programme in FY23.

Impact?

- Reduce the cost of borrowing– allowing banks to buy the G-Secs aggregating up to ₹1.70-lakh crore without worrying about investment depreciation provision in the current rising yield scenario. Thus, reduce the bond supply relative to the demand causing the bond price to rise and its yield to fall. reduce liquidity and inflation -banks buy Gsec in exchange pating liquidity held on their part to the govt.
- The entire investment portfolio of the banks (including SLR securities and non-SLR securities) are classified under 3 categories viz. ‘Held to Maturity’, ‘Available for Sale’ and ‘Held for Trading’.
- Held-to-maturity securities are debt security investments that the holder has the intention and ability to hold till a specific date of maturity.
- The investments classified under HTM needn't be marked to market and can be carried at acquisition cost, as subsequent changes in market value are ignored because the returnis predetermined that the increase in HTM Thus, raising the limit by 1 per cent could create an additional headroom of ₹1.6-1.7-lakh crore for banks to hold the government securities, without marking them to market in a rising bond yield scenario and thereby preventing any loss.

Topic 10. WHO CONTINGENCY FUND FOR EMERGENCY

Importance for Prelims:IR



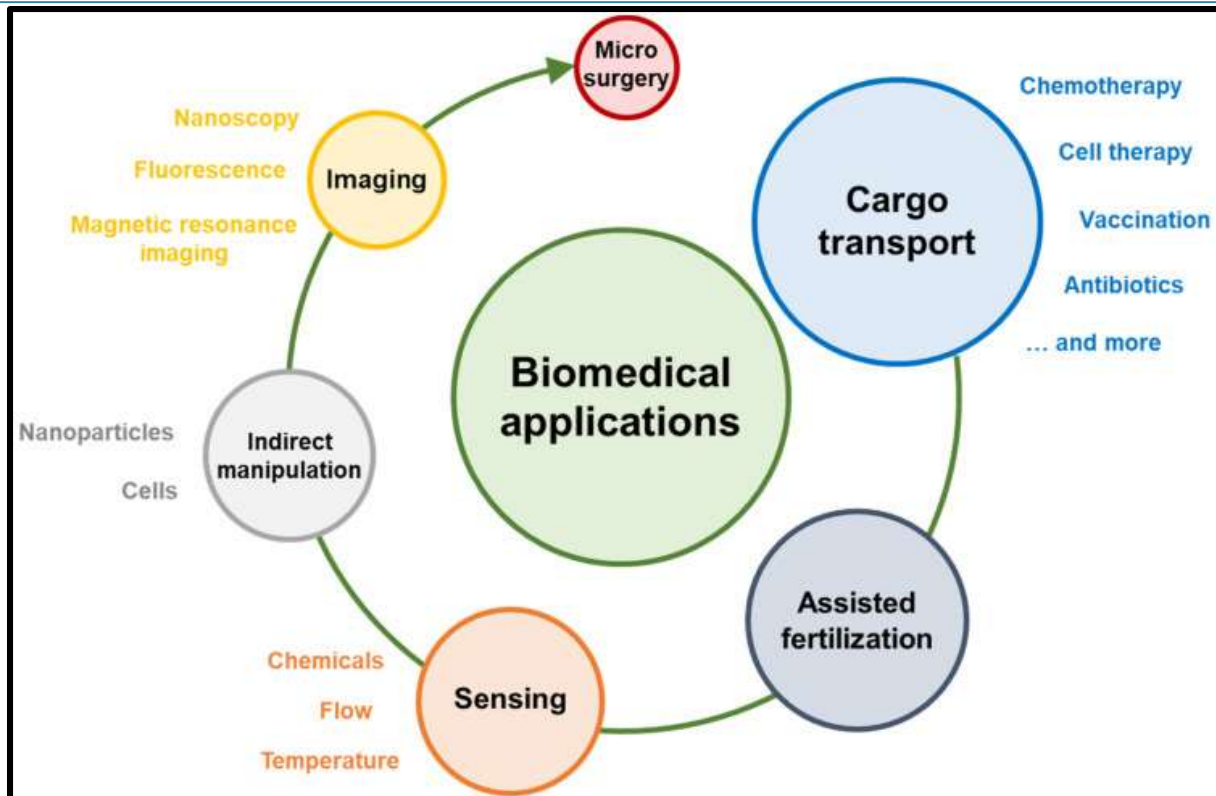
The World Health Organization has called for sustained and safe access for the delivery of humanitarian assistance even as the Russian invasion of Ukraine continues.

- Further, \$3.5 million from the WHO's Contingency Fund for Emergencies (CFE) has been provided to purchase and deliver urgent medical supplies.
- The CFE was established in 2015 by a resolution of the World Health Assembly, the decision making body of WHO.
- It had been created as an internal financing mechanism to save lots of time, resources and lives by enabling who to respond rapidly to sickness outbreaks and health emergencies, often in twenty four hours or less.
- The CFE has helped transform WHO into a first responder in health crises, enabling it to fulfill its vision to protect people in emergencies and keep the world safe.
- The CFE relies entirely on the generous support of who Member State governments and other contributors who recognize WHO's critical role in crisis response and understand that, in an emergency, every hour counts.

- **Mechanism:** The CFE operates within the WHO Emergency Response Framework, which guides the Organization's response to health emergencies.
- When an event such as an outbreak is confirmed and presents a serious threat, the CFE can allocate US\$ 50 000 immediately to finance a risk assessment.
- If an event requires a higher level of operational response, the event undergoes grading, an internal activation procedure that triggers who emergency procedures and activities for the management of the response.
- For graded events, whether new or an escalation of an existing emergency, there is no limit to the amount that can be requested from the CFE.
- Up to US\$ 500 000 can be fast-tracked in as very little as twenty four hours, with higher amounts requiring approval of the executive Director, who Health Emergencies Programme.
- For graded events, WHO's Incident Management System (IMS) and the emergency standard operating procedures are activated.
- The IMS guides WHO's operational response, identifying critical roles and responsibilities, including financial management with highest level monitoring observance and accountability from all 3 levels of the Organization.
- CFE funds are typically used within the first 3 months of a response and may be extended if needs persist.
- Allocations from the CFE should be reimbursed to the extent possible.
- All unspent funds are the returned to the CFE.

Topic 11. 'MICRO-SWIMMERS' MAY SOON HELP WITH DRUG DELIVERY

Importance for Prelims: Science & Tech



it is possible to use light as a fuel to move microbots in real body conditions with intelligent drug delivery that is selectively sensitive to cancer cells.

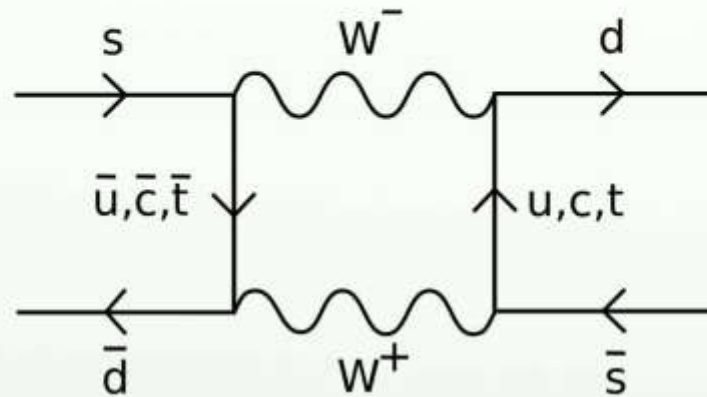
- **Microbots:** Made from the two dimensional compound poly (heptazine imide) carbon nitride (aka PHI carbon nitride), these microbots are nothing like the miniaturized humans.
- They range from 1 - 10 micrometre (a micrometre is one millionth of a metre) in size, and can selfpropel when energised by shining light.
- How they swim The PHI carbon nitride microparticles are photocatalytic.
- Like during a solar cell, the incident light is converted into electrons and holes.
- These charges drive reactions in the surrounding liquid.
- This reaction, combined with the particle's electric field, makes the microbots (microswimmers) swim.

- As long as there's light, electrons and holes are produced on the surface of the swimmers, which in turn react to form ions and an electric field around the swimmer.
- These ions move around the particle and cause fluid to flow around the particle.
- Therefore this fluid flow causes the micro swimmers to move.
- Just like the fragrance of incense wafts from a region of high concentration to low, the ions move from the bright surface of the microswimmer to the rear end.
- The particles are nearly spherical, and therefore the incident light illuminates one half of the sphere, leaving the other dark.
- As photocatalysis is light driven, it occurs only on the brightened hemisphere.
- As the ions move from the bright side to the dark side, micro swimmers march towards the direction of the light source.
- Drug delivery The researchers found that Doxorubicin, a drug used to treat cancer, was readily absorbed.
- By changing the pH of the solution or by triggering it with light, the researchers showed the drug release could be activated.

Topic 12. W BOSON PARTICLES

Importance for Prelims: Science & Tech

W and Z bosons



W boson mass measurement surprises physicists. The Higgs boson mass allowed physicists to infer that the mass of the W boson would be $80,357 \pm 6$ MeV.²

- In particle physics, the W and Z bosons are vector bosons that are together known as the weak bosons or more generally because the intermediate vector bosons.
- These elementary particles mediate the weak interaction; the respective symbols are W^+ , W^- , and Z^0 .
- The W^\pm bosons have either a positive or a negative electric charge of 1 elementary charge and are each other's antiparticles.
- The Z^0 boson is electrically neutral and is its own antiparticle.
- All three of these particles are very short-lived, with a half-life of about 3×10^{-25} s.
- Their experimental discovery was pivotal in establishing what's now called the standard Model of particle physics.
- These bosons are amongst the heavyweight of the elementary particles. With masses of $80.4 \text{ GeV}/c^2$ and $91.2 \text{ GeV}/c^2$, respectively, the W and Z bosons are almost eighty times as massive as the proton – heavier, even, than entire iron atoms.

- The W^\pm bosons are best known for their role in nuclear decay.
- Consider, for example, the beta decay of cobalt-60.

What is Higgs Boson?

- In 2012, the Nobel-winning discovery of the Higgs boson(also known as ‘God particle’) validated the Standard Model of physics, which also predicts that about 60% of the time a Higgs boson will decay to a pair of bottom quarks.
- In Nineteen Sixties Peter Higgs was the first person to suggest that this particle might exist.
- The Standard Model of particle physics is the theory which describes three of the four known fundamental forces (the electromagnetic, weak, and strong interactions, and not including the gravitational force) in the universe, as well as classifies all known elementary particles.
- Scientists do not yet know how to combine gravity with the Standard Model.
- The Higgs particle is a boson. Bosons are thought to be particles that are responsible for all physical forces.
- Other known bosons are the photon, the W and Z bosons, and the gluon.
- **Boson:** In particle physics, a boson is a subatomic particle whose spin quantum number has an integer value.
- Bosons form one of the two fundamental classes of subatomic particle, the other being fermions, which have odd half-integer spin Every observed subatomic particle is either a boson or a fermion.

Topic 13. CAN'T DE-REGISTER POLITICAL PARTIES FOR OFFERING FREEBIES: ECI TELLS SC

Importance for Prelims:Polity

Election Commission of the India has told the Supreme Court that offering any freebies either before or after the election is a policy decision of the party and that the Commission cannot regulate state policies and decisions which may be taken by the winning party when they form the govt..

- Background Petition has been filed in the Supreme Court seeking a direction to the Election Commission of India (ECI) to seize the election symbol or deregister a political party that promises or distributes “irrational freebies” from public funds before elections.
- The petition argued that the recent trend of political parties to influence voters by offering freebies with an eye on elections isn't only the greatest threat to the survival of democratic values however also injures the spirit of the Constitution.
- The affidavit has been filed by ECI to the PIL says “Election Commission of India cannot regulate state policies and the decisions which may be taken by the winning party when they form the government.
- Such an action, without enabling provisions in the law, would be an overreach of powers” SC with regards to the role of ECI had observed that Considering that there is no enactment that directly governs the contents of the election manifesto, we hereby direct the Election Commission to frame guidelines for the same in consultation with all the recognized political parties as when it had acted while framing tips for general conduct of the candidates, meetings; processions, polling day, party in power etc.
- In the similar way, a separate head for guidelines for election manifesto released by a political party may also be included in the Model Code of Conduct for the Guidance of Political Parties & Candidates.
- Registering a Political Party The registration of all political parties is governed by the provisions of the Representation of the People Act, 1951.

- According to the election commission (EC), any party seeking registration should submit an application to the Commission within a period of thirty days.
- This is done as per guidelines prescribed by the EC in exercise of the powers conferred by Article 324 of the Constitution and Section 29A of the RP Act, 1951.
- Process of registration The applicant is asked to publish a proposed party name in two national daily newspapers and two local daily newspapers, and provide two days for submitting objections, if any.

Why registering with the EC is important?

- Registering as a political party with the EC has its advantage in terms of intending to avail itself of the provisions of the RP Act, 1951.
- The candidates set up by a political party registered with the EC can get preference in the matter of allotment of free symbols vis-à-vis purely independent candidates.
- Registered political parties, over course of time, can get recognition as a 'state party' or a 'national party'.
- Recognised 'state' and 'national' parties: need just one proposer for filing the nomination and are also entitled for 2 sets of electoral rolls free of cost and broadcast/telecast facilities over state-owned Akashvani / Doordarshan during the general elections. But no travel expenses for star campaigners.
- There is no procedure available for the de-registration of dormant political parties.
- **Political Parties need to satisfy conditions to recognized:** For recognition as a National Party
 1. 6% vote share in the last Assembly polls in each of any four states, as well as four seats in the last Lok Sabha polls; or

2. 2% of all Lok Sabha seats in the last such election, with MPs elected from at least three states; or
3. Recognition as a state party in at least 4 states. For recognition as a State Party
4. two seats plus a 6% vote share in the last Assembly election in that state; or 2. one seat plus a 6% vote share in the last Lok Sabha election from that state; or 3. 3% of the total Assembly seats or
5. 3 seats, whichever is more; or
6. one of every 25 Lok Sabha seats (or an equivalent fraction) from a state; or
7. an 8% state-wide vote share in either the last Lok Sabha or the last Assembly polls.

ECI said that registration of political parties can only be cancelled on three grounds which are:

1. where a political party has obtained registration by practising fraud or forgery;
2. where a registered political party amends its nomenclature of association, rules and regulations abrogating therein conforming to the provisions of Section 29A(5) of the Act or intimating the Election Commission that it has ceased to have faith and allegiance to the Constitution of India or to the principles of socialism, secularism and democracy or it would not uphold the sovereignty, unity and integrity of India so as to comply the provisions of Section 29A(5) of the Act; and
3. any like ground where no enquiry is called for on the part of the Commission

Topic 14. PANDIT BHIMSEN JOSHI

Importance for Prelims:History



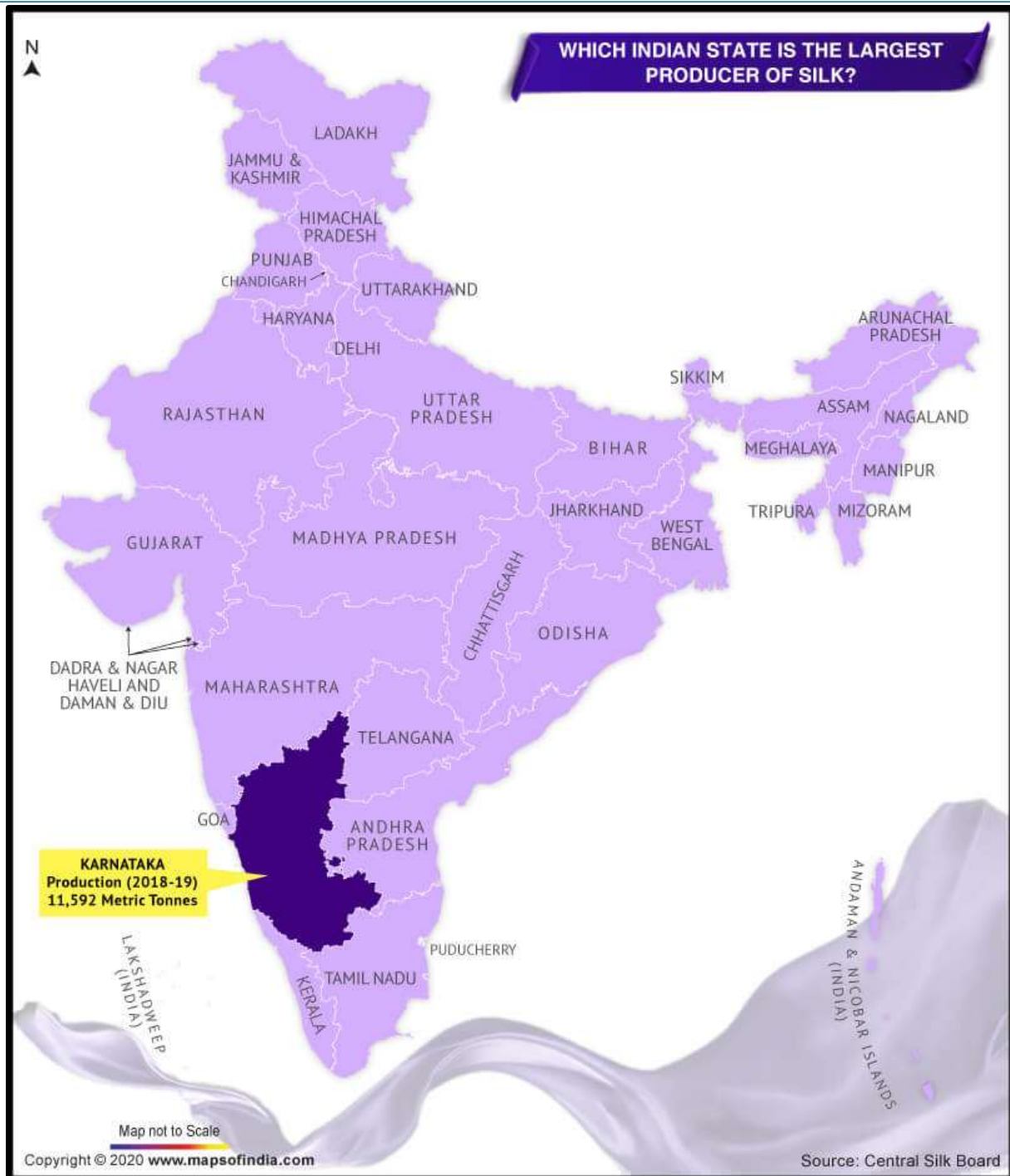
Pandit Bhimsen Joshi would have turned one hundred this year.

- About Pandit Bhimsen Joshi Pandit Bhimsen Gururaj Joshi (1922 –2011) was an Indian vocalist from Karnataka, in the Hindustani classical tradition.
- A brilliant exponent in the field of Hindustani classical music Famous for perfecting the Khayal, a form of Hindustani classical Bhimsen Joshi belongs to the Kirana gharana tradition of Hindustani Classical Music.
- He was also known for his presentation of devotional music – his ‘bhajans’, that were usually sung in Kannada, Hindi and Marathi languages

- He has also recorded Kannada Dasa Krithis in Dasavani, the likes that are usually sung by Carnatic musicians.
- Bhimsen Joshi was instrumental in organising the Sawai Gandharva Music Festival annually, as homage to his guru, Pandit Sawai Gandharva.
- Hindustani Classical Music Hindustani music is one of the two principal types of South Asian classical music.
- It is found mainly in the northern three-fourths of the subcontinent, where IndoAryan languages are spoken.
- The roots of the Hindustani Music is traced to the emergence of Dhrupad & Dhamar.
- It further developed into Vocal & Instrumental Streams.
- Further emergence of Khayal from Dhrupad as a results of influence of the Mughal Kingdom, classical music underwent a change in character, moving from Temples to the Courts.
- Miyan Tansen have been one among the greatest influence on the Hindustani style.
- **Gharanas:** A Gharana is a system of social organisation linking musicians or dancers by lineage or apprenticeship, and by adherence to a particular musical style.
- Function in guru-shishya parampara, i.e. disciples learning under a particular guru and transmitting his musical knowledge and style.
- Kirana Gharana founded by the Ustad Abdul Karim Khan.
- Famous artists such as Abdul Wahid Khan, Suresh Babu Mane,
- Hira Bai Badodekar and Roshanara Begum belong to this Gharana.

Topic 15. BENGALURU HAS BECOME THE FIRST INDIAN CITY TO GET INTO THE GLOBAL NETWORK OF SILK CITIES

Importance for Prelims: Geography



Bengaluru has become the first Indian city to get into the global network of silk cities. Silk Production in India: Silk is the most elegant textile in the world with unparalleled grandeur, natural sheen, and inherent affinity for dyes, high absorbance, light weight, soft touch and high durability and known as the “Queen of Textiles” the world over.

- India has the unique distinction of being the only country producing all the five known commercial silks, namely, mulberry, tropical tasar, oak tasar, eri and muga (golden yellow glitter is unique and prerogative of India).
- **Major silk producing states in the country:** Mulberry sericulture is mainly practised in states such as Karnataka, Andhra Pradesh, Assam, West Bengal(concentrated in Murshidabad) , Jharkhand and Tamil Nadu North East India has one of the unique distinction of being the only one region producing four Types of silk viz., the Mulberry, Oak Tasar, Muga and the Eri.
- Overall NE region contributes 18% of India's total silk production.
- India is the second largest producer of silk in the world.
- India is the largest consumer of silkin the world. Geographical Indications of Indian silk
 - ❖ Baluchari Saree – West Bengal
 - ❖ Salem Silk – Tamil Nadu
 - ❖ Arani Silk – Tamil Nadu
 - ❖ Molakalmuru Sarees – Karnataka
 - ❖ Ilkal Sarees – Karnataka
 - ❖ Muga Silk – Assam
 - ❖ Orissa Ikat – Odisha
 - ❖ Kancheepuram Silk – Tamil nadu
 - ❖ Mysore Silk – Karnataka
 - ❖ Chanderi Fabric – Madya Pradesh

Topic 16. IMF SUPPORT SYSTEM

Importance for Prelims:Economy



Sri Lanka will need about \$3 billion in external assistance within the next six months to help restore supplies of essential items, including fuel and medicines, to manage a severe economic crisis.

- The International Monetary Fund assists countries hit by crises by providing them financial support to create breathing room as they implement adjustment policies to restore economic stability and growth.
- It also provides precautionary financing to help prevent and insure against crises.
- The IMF provides financial support for balance of payments needs upon request by its member countries.

- Unlike development banks, the International Monetary Fund doesn't lend for specific projects.
- Typically, a country's government and the IMF must agree on a program of economic policies before the IMF provides lending to the country.
- A country's commitments to undertake certain policy actions, known as policy conditionality, are in most cases an integral part of International Monetary Fund lending
- However, for some arrangements, countries can use IMF resources with no or limited conditionality if they have already established their commitment to sound policies or where they are designed for urgent and immediate needs.
- The IMF's various lending instruments are tailored to different types of balance of payments need as well as the specific circumstances of its diverse membership General Resources Account-All members are eligible to access the Fund's resources in the General Resources Account (GRA) on the non-concessional terms.
- Funds for PRGT lending are the obtained through bilateral loan agreements at market interest rates.
- Subsidy resources make up the difference between the market rates received by lenders and the concessional rates paid by LIC borrowers.
- Poverty Reduction and Growth Trust-concessional financial support (currently at zero interest rates) available through the Poverty Reduction and Growth Trust Stand-By Arrangements (SBAs)- in case of emerging and advanced market economies in crises, the bulk of IMF assistance has been provided through StandBy Arrangements to address short-term or potential balance of payments problems. Standby Credit Facility (SCF) - Financing for LICs with actual or potential shortterm balance of payments and adjustment needs caused by domestic or external shocks, or policy

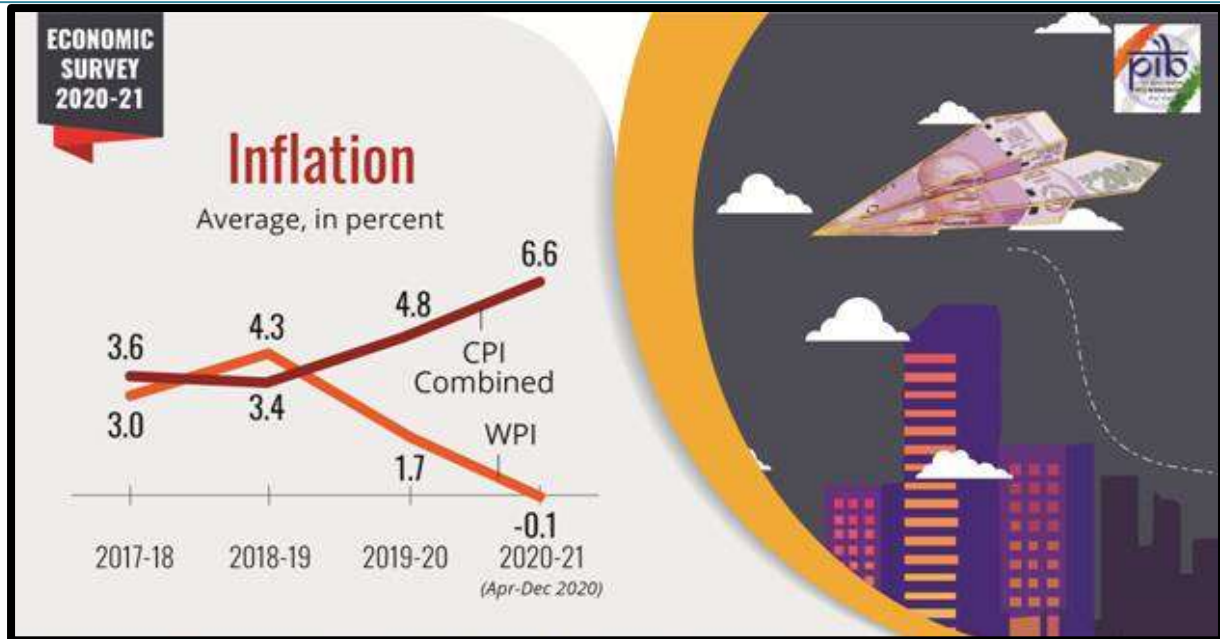
slippages—can also be used on a precautionary basis throughout times of increased risk and uncertainty.

- The Extended Fund Facility (EFF) -Fund's main tool for medium-term support to emerging and advanced countries facing protracted balance of payments problems Extended Credit Facility (ECF) for low-income countries are the Fund's main tools for medium-term support to countries facing protracted balance of payments problems Flexible Credit Line (FCL) or the Precautionary and Liquidity Line (PLL)-To help prevent or mitigate crises and boost market confidence during periods of heightened risks, members with already strong policies will use the flexible Credit Line (FCL) or the precautionary and Liquidity Line (PLL).
- The rapid financing Instrument (RFI) –for emerging and advanced countries provide rapid assistance to countries with urgent balance of payments needs, as well as from commodity price shocks, natural disasters, and domestic fragilities.
- Rapid Credit Facility (RCF)-Rapid financial support as a single up-front payout for low-income countries facing urgent balance of payments needs—possible repeated disbursements over a (limited) period just in case of recurring or ongoing balance of payments needs.
- Catastrophe Containment and Relief Trust-In February 2015, the IMF repurposed the Post-Catastrophe Debt Relief Trust, into the Catastrophe Containment and Relief Trust.
- Under the new trust the International Monetary Fund can join international debt relief efforts for poor countries hit by the foremost catastrophic of natural disasters.
- It also can assist countries battling public health disasters—such as infectious disease epidemics—with grants for debt service relief.

- GRA-supported programs are expected to resolve the member's BoP problems throughout the program period, whereas PRGT programs envisage a longer duration for addressing BoP problems.
- The Policy Support Instrument (PSI) and therefore the Policy Coordination Instrument (PCI) don't provide financial support, however the PSI could be a PRGT instrument whereas the PCI applies to both PRGT and GRA.

Topic 17. INFLATION SURVEY

Importance for Prelims: Economy



According to the reserve bank of india survey, for a majority of population and age groups, uncertainty in inflation expectations increased for both 3 months and one year horizons, as compared to the previous survey round according to the Inflation Expectations Survey of the Households. According to the central bank's Consumer Confidence Survey (CCS), consumer confidence for the current period continued on its recovery path.

- Inflation Expectations Survey of HouseholdsThe survey is conducted at bi-monthly intervals by the Reserve Bank of India.
- It provides directional info on near-term inflationary pressures as expected by the respondents and will reflect their own consumption patterns. Hence, they should be treated as households' sentiments on inflation.
- The survey aims at capturing subjective assessments on price movements and inflation, of approximately 6,000 households, based on their individual consumption baskets, across 18 cities, including -Ahmedabad, Bengaluru, Bhopal, Bhubaneswar, Chandigarh.
- The survey seeks qualitative responses from households on price changes (general prices as well as prices of specific product groups).

- It measures Households' median inflation perceptions in three periods– for the current period, three months ahead as well as in the one year ahead period.
- Consumer Confidence Survey It is conducted every two months by the Reserve Bank of India.
- The CCS is a survey that indicates how optimistic or pessimistic consumers are regarding their expected financial situation.
- If the consumers are optimistic, spending will be more, whereas if they're not so confident, then their poor consumption pattern might lead to recession.
- Consumer Confidence Survey (CCS) for the March 2022 round was conducted from March 02 to March 11, 2022 in nineteen major cities including Bengaluru, Chennai, Delhi, Hyderabad, Ahmedabad, Jaipur, Lucknow, Patna, Thiruvananthapuram, Mumbai.
- The survey obtains current perceptions (vis-à-vis a year ago) and the one year ahead expectations on general the economic situation, employment scenario, overall price situation and own income and spending from 5,984 households across these cities.
- Based on these specific responses, the RBI constructs two indices: the Current Situation Index (CSI) and the Future Expectations Index (FEI).
- The CSI maps how people view their current situation (on income, employment etc.) vis a vis a year ago.
- The FEI maps however people expect the situation to be (on the same variables) a year from currently.
- Consumer Confidence Survey- march 2022

Topic 18. WHAT IS DEFAULT AND ITS IMPACT

Importance for Prelims:Economy

S&P on the Saturday lowered Russia's foreign currency ratings to the "selective default" on increased the risks that Moscow won't be able and willing to honour its commitments to the foreign debt holders.

- **Details:** Russia had made coupon and principal payments on dollar-denominated Eurobonds in rubles which investors may not be able to convert into dollars equivalent to the originally due amounts given the amount of the economic sanctions on Russia.
- S&P assigns a selective default rating once it believes the debtor has selectively defaulted on a specific issue or class of obligations however can still meet its payment obligations on other issues or classes of obligations in an exceedingly timely manner.
- Sovereign debt Default Sovereign debt is the bonds a Sovereign country sells to the banks in foreign currency to finance its domestic financial requirement.
- Sovereign default is the failure by a government to repay its national debts. Sovereign default is that the same as a default on debt by a non-public individual or business, however by a national government that fails to repay its interest or principal due.
- Sovereign nations are not subject to normal bankruptcy laws and always have the power to escape responsibility for their debts, often without legal consequences.
- Nations that maintain their own currency and whose debt is denominated in that currency will have the option to effectively default by inflating their currency and printing more money to cover the outstanding portion.
- **Causes:** Sovereign defaults are relatively rare and are often precipitated by an economic crisis affecting the defaulting nation.
- Economic downturns, political upheaval, and excessive public spending and debt will all be warning signs that result in sovereign default.

- Higher interest rates and a lower credit rating among lenders, making it is more difficult to borrow in the future.
- Large scale short term borrowing- Governments that rely on financing through short-term bonds may be especially vulnerable to a sovereign debt default since short-term bonds already face a difficult conflict of maturity mismatch between short-term bond financing and therefore the long-term asset value of a country's tax base.
- **Impact:** Recession- In the United States, for instance, the interest rates on many mortgages, car loans, and student loans are pegged to U.S. Treasury rates.
- If borrowers were to experience dramatically higher payments as the result of a U.S. debt default, the result would be substantially less disposable income to pay on merchandise and services, that could ultimately lead to a recession.
- **Stagflation**– reduction in output and employment along with high inflation.
- Reduction in investment confidence and rise in unproductive investments.
- Difficult to borrow in future Large scale capital outflows and currency depreciation

Topic 19. DIFFERENT TYPES OF FOOD INDEX -FAO

Importance for Prelims:Economy

Glycemic Index of Some Common Foods*

High Glycemic Index Foods (GI > 85)

Cream of Wheat	Cornmeal	English muffin	Sport drinks
Shredded Wheat	Croissant, doughnut	Mashed potatoes	Soft drinks
Total cereal	Rice cakes	Carrots	Hard candy
Crispix cereal	Pop-Tarts	Watermelon	Jelly beans
Corn Flakes, Rice	Angel food cake	Raisins	Syrups or sucrose
Krispies, Bubbles	White bread or bagel	Pretzels	Glucose, maltose
Cheerios	Soda crackers	Couscous	Molasses
Corn Chex cereal	Corn chips	Gnocchi	Fruit Roll-Ups
Grape-Nuts	Waffles, pancakes	Vanilla wafers	Dates

Moderate Glycemic Index Foods (GI = 60-85)

100% whole wheat bread	Brown or wild rice	Popcorn	Grapes
Rye kernel bread	Cracked barley	Sponge cake	Grapefruit juice
7-grain bread	White rice (long grain)	Linguine, durum	Orange (whole or juice)
Pita bread, white	Buckwheat	Sweet corn	Fruit cocktail
Oat bran cereal	Basmati rice	Oat bran	Mango or papaya
Bran Chex cereal	Wheat, cooked	Oatmeal	Kiwi fruit
Special K cereal	Bulgur	Marmalade or honey	Cranberry juice
All-Bran Cereal	Parboiled rice	Ice cream, low-fat	
		Sweet potato	

Low Glycemic Index Foods (GI <60)

Barley kernel bread	Fettuccini, egg	Beans (all types)	Apples (whole or juice)
Wheat kernels	Apricots (dried)	Peaches or pears (fresh)	Power bar
Tomato soup	Rice bran	Fructose	Oat bran bread
Cherries, plums	Soy milk or drink	Hummus	Lentils
Milk (whole or nonfat)	Dried peas	Peanuts	Grapefruit
Yogurt (all types)	Banana		Peanut M&Ms
	Barley		

*White bread (50 g) was used as the reference food.

Global food prices rising

- The Food Price Index (FFPI) By the Food and Agriculture Organisation (FAO) on a monthly basis.

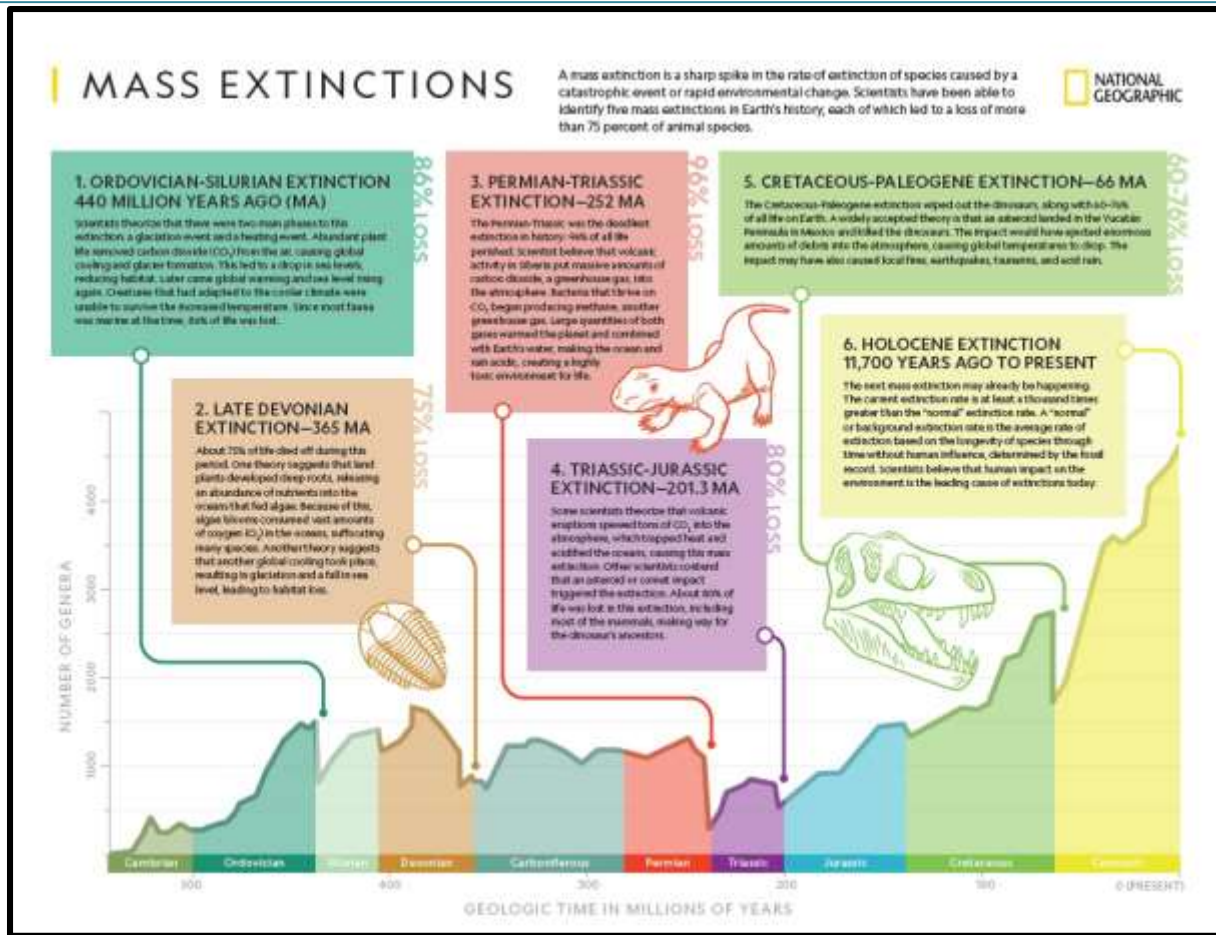
- **First introduced in 1996. Purpose:** To track the developments in the global agricultural commodity markets, and to keep an eye on the world food situation.
- **Base period:** 2014-16 The Food and Agriculture Organization Food price index (FFPI) records the monthly fluctuations in the international food prices for a basket of 5
- **commodities: Cereals**– The FAO Cereal Price Index Vegetable oil-The FAO Vegetable Oil Price Index Dairy products-The FAO Dairy Price Index Meat-The FAO Meat Price Index Sugar– The FAO Sugar Price Index Unlike for other commodity groups, most prices utilized in the calculation of the FAO Meat Price Index are not available when the FAO Food Price Index is computed and published; therefore, the value of the Meat Price Index for the most recent months is derived from a mixture of projected and observed prices.
- This can, at times, need significant revisions in the final price of the Food and Agriculture Organization Meat price index that could in turn influence Food and Agriculture Organization of the Food and Agriculture Organization Food Food price index.

Other Publication of FAO

1. The State of World Fisheries and the aquaculture (SOFIA).
2. The State of the World's Forests (SOFO).
3. The State of Food Security and Nutrition in the World (SOFI).
4. The State of Food and Agriculture (SOFA).
5. The State of Agricultural Commodity Markets (SOCO).

Topic 20. SIXTH MASS EXTINCTION

Importance for Prelims:Environment



The on-going sixth mass extinction may be one of the most serious environmental threats to the persistence of civilisation, according to new research.

What is the mass extinction of species?

- Mass extinction refers to a substantial increase in the degree of extinction or when the earth loses more than three-quarters of its species in a very geologically short period of time.
- So far, during the entire history of the Earth, there have been five mass extinctions.
- The 5 mass extinctions that took place in the last 450 million years have led to the destruction of 70-95 per cent of the species of plants, animals and microorganisms that existed earlier.

- These extinctions were caused by “catastrophic alterations” to the environment, such as huge volcanic eruptions, depletion of oceanic oxygen or collision with an asteroid.
- After each of these extinctions, it took millions of years to regain species comparable to those that existed before the event.

What is the sixth mass extinction?

- The sixth, that is ongoing, is referred to because the Anthropocene extinction. Researchers have described it because the “most serious environmental problem” since the loss of species are permanent.

Why it is attributable to humans?

- The global Assessment Report on biodiversity and ecosystem Services”, the first such by the Intergovernmental SciencePolicy Platform on biodiversity and ecosystem Services (IPBES) released in 2019, shows that the current rate and the scale of the extinction is unprecedented and is being caused majorly by humans. one among the reasons that humanity is an “unprecedented threat” to many living organisms is because of their growing numbers.
- The loss of species has been occurring since human ancestors developed agriculture over 11,000 years ago.
- Since then, the human population has raised from about one million to 7.7 billion.
- **Changes occurred and occurring:** The IPBES assessment says that 1 million animal and plant species face extinction and thousands of these would become extinct within decades.
- About 40 per cent of the planet’s amphibian species are threatened with extinction. Since 1900, the number of native species in most of the land-based habitats has declined by twenty per cent.

- The World Wildlife Fund's (WWF's) "Living Planet Report 2020" says the Asia Pacific region lost 45 per cent of its vertebrate population in four-and-half decades, while the average global loss is 68 per cent.
- The biennial report, prepared jointly by WWF and Zoological Society of London, is based on the global dataset analysed between 1970 and 2016.
- The report has been tracked almost 21,000 populations of the mammals, birds, fish and reptiles globally to reach its conclusions.
- It showed the loss of vertebrate population was the highest in the Caribbean and Latin America (94 per cent), followed by Africa (65 per cent), with Europe and Central Asia showing the least loss (24 per cent). The loss could be above the global average in India, that has lost twelve per cent of its wild mammals, nineteen per cent of its amphibians and three per cent of its birds over the past five decades.
- **Reasons for Extinction:** The "Living Planet Report 2020" points out five major reasons behind the biodiversity loss across the planet: changes in land and sea use (habitat loss and degradation), overexploitation of species, invasive species and disease, pollution and global climate change.
- **Vulnerable regions:** Tropical regions have seen in the highest number of declining species.
- In South and southeast asia, large-bodied species of mammals have lost more than four-fifths of their historical ranges.
- While fewer species are disappearing in temperate zones, the percentage is just as high or higher.
- As many as half of the number of animals that once shared our planet are no longer here, a loss described as "a massive erosion of the greatest biological diversity in the history of Earth".
- In the Asia Pacific region, including India that's experiencing loss of species higher than the worldwide average, habitat degradation is the

biggest trigger, followed by species overutilization and and invasive species and disease.

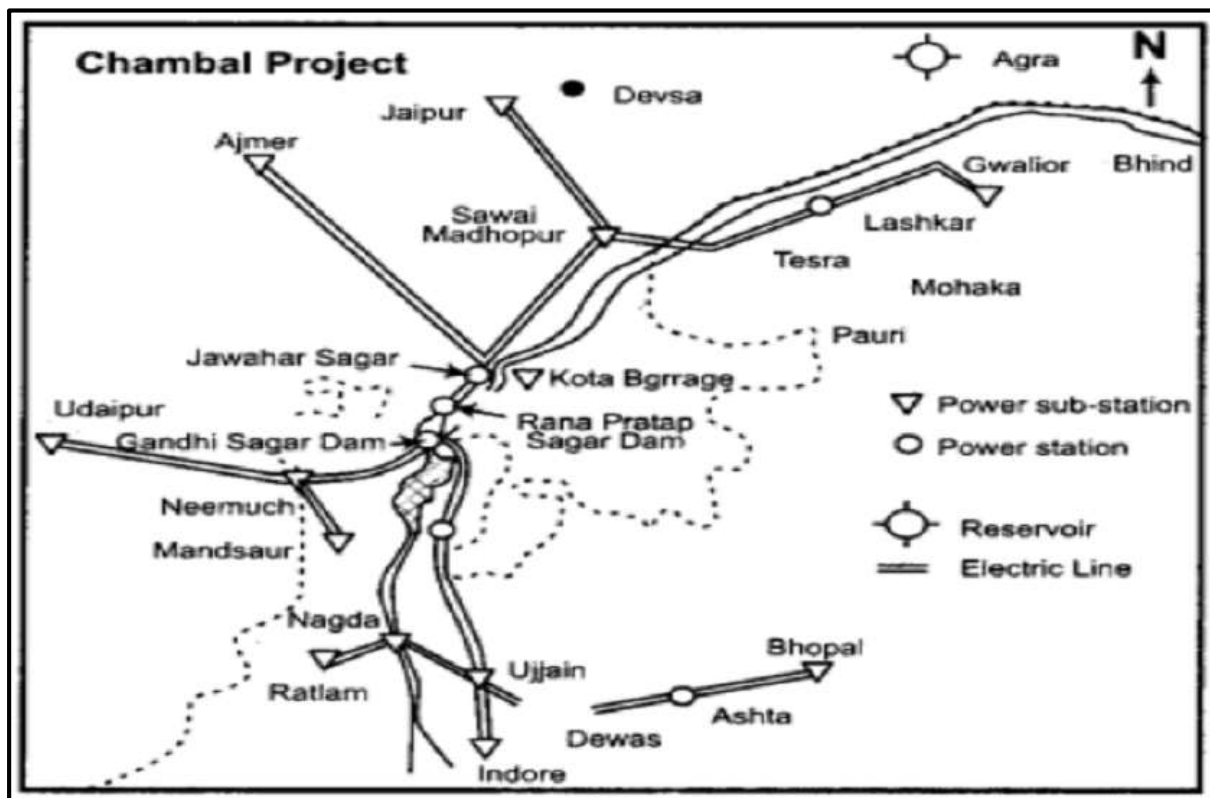
- The role of pollution and climate change was proportionately higher at 16 per cent.

What happens when species go extinct?

- Impact can be tangible like in the sort of a loss in crop pollination and water purification.
- If a species has a specific function in an ecosystem, the loss can lead to consequences for other species by impacting the food chain.
- Effects of extinction can worsen in the coming decades because the resulting genetic and cultural variability can change entire ecosystems.

Topic 21. EASTERN RAJASTHAN CANAL PROJECT

Importance for Prelims: Geography



The Chief Minister of Rajasthan has demanded the national project status for the Eastern Rajasthan Canal Project (ERCP).

- The main advantage of a project which has received national project status is that 90% of the funding for the project will be given by the central government.
- The estimated cost of the ERCP is around Rs. 40,000 crore.
- **About the Eastern Rajasthan Canal Project:** It aims to harvest surplus water available during rainy season in rivers in Southern Rajasthan such as Chambal and its tributaries, including Kunnu, Parvati, Kalisindh, and use this water in south-eastern districts of the state, where there is scarcity of water for drinking and irrigation.
- ERCP is planned to meet drinking and industrial water needs of the southern and south eastern Rajasthan, for humans and Livestock till the year 2051.

- It proposes to provide drinking water to 13 districts of Rajasthan and provide irrigation water for 2.8 lakh hectares of land through 26 different large and medium projects.
- **13 districts:** Jhalawar, Baran, Kota, Bundi, Sawai Madhopur, Ajmer, Tonk, Jaipur, Karauli, Alwar, Bharatpur, Dausa and Dholpur.
- **Chambal River:** It is one of the most pollution-free rivers of India.
- It originates at the Singar Chouri peak in the northern slopes of the Vindhya mountains (Indore, Madhya Pradesh).
- From there, it flows in the North direction in Madhya Pradesh for a length of about 346 km and then follows a north-easterly direction for a length of 225 km through Rajasthan.
- It enters U.P. and flows for about 32 km before joining the Yamuna River in Etawah District. It is a rainfed river and its basin is bounded by the Vindhyan mountain ranges and the Aravallis.
- The Chambal and its tributaries drain the Malwa region of northwestern Madhya Pradesh.
- The Hadauti plateau in Rajasthan occurs in the upper catchment of the Chambal River to the southeast of the Mewar Plains.
- **Tributaries:** Banas, Kali Sindh, Sipra, Parbati, etc. Main Power Projects/ Dam: Gandhi Sagar Dam, Rana Pratap Sagar Dam, Jawahar Sagar Dam, and Kota Barrage.
- The National Chambal Sanctuary is located along river Chambal on the tri-junction of Rajasthan, Madhya Pradesh and Uttar Pradesh.
- It is known for critically endangered gharial, the red-crowned roof turtle, and the endangered Ganges river dolphin.

Topic 22. STATE ENERGY & CLIMATE INDEX: NITI

Importance for Prelims:Governance

Gujarat has topped the list for larger States in the NITI Aayog's State Energy and Climate Index–Round 1 that has ranked States and Union Territories (UTs) on certain parameters.

Performance by the states:

- Gujarat, Kerala and Punjab have been ranked because the top 3 performers in the category of larger States, while Jharkhand, Madhya Pradesh and Chhattisgarh were the bottom 3 States.
- Goa emerged as the top performer in the smaller States category followed by Tripura and Manipur.
- Among UTs, Chandigarh, Delhi and Daman & Diu/Dadra & Nagar Haveli are the top performers.
- Punjab was the best performer in the discom performance, while the Kerala topped in access, affordability and reliability category.
- Haryana was the best performer in clean energy initiative among larger States and Tamil Nadu in the energy efficiency category.
- **State Energy and Climate Index:** The States have been categorized based on size and geographical differences as larger and smaller States and UTs.
- The index is based on 2019-20 data. It ranks the states' performance on six parameters, namely DISCOM's Performance Access, Affordability and reliability of Energy Clean Energy Initiatives Energy efficiency Environmental Sustainability; and New Initiatives The parameters are further divided into 27 indicators. Based on the composite SECI round I score.
- **The states and UTs are categorized into three groups:** Front Runners, Achievers, and Aspirants India's performance on other indices At an international level, India's ranking indices varied depending on assessment parameters.

1. World Energy Trilemma Index :In the World Energy Trilemma Index, which looked at energy security, energy equity, environmental sustainability and country context dimension (macroeconomics, governance and institutional conditions), India ranked 75th out of 127 countries.

2. World Economic Forum's Energy Transition Index:India stood at 87th rank among 115 countries in the World Economic Forum's Energy Transition Index, which focused on sector performance and energy transition.

3. Ernest and Young Renewable Energy Country Attractiveness Index:India was placed in the third position. it's also remained among the highest ten countries in the climate change Performance Index, which assesses climate protection performance. However, India is among the foremost vulnerable countries to global climate change, according to the Intergovernmental Panel on global climate change.

Topic 23. THE LANGUAGE THAT NATION SPEAKS

Importance for Prelims:Polity

Last week, Home Minister Amit Shah suggested that states should communicate with each other in Hindi rather than English, while stressing that Hindi should not be an alternative to local languages. This again sparked the debate of “Hindi imposition”.

How widely is Hindi spoken in India?

- The 2011 linguistic census accounts for 121 mother tongues, as well as twenty two languages listed in the eighth Schedule of the Constitution.
- Hindi is the most widely spoken, with 52.8 crore individuals, or 43.6% of the population, declaring it as their mother tongue.
- The next highest is Bengali, mother tongue for 97 lakh (8%) — less than one-fifth of Hindi’s count In terms of the number of people who know Hindi, the count crosses more than half the country.
- Nearly 13.9 crore (over 11%) reported Hindi as their second language, which makes it either the mother tongue or second language for nearly 55% of the population.

Has it always been this widespread?

- Hindi has been India’s predominant mother tongue over the decades, its share in the population rising in every succeeding census.
- In 1971, 37% Indians had reported Hindi as their mother tongue, a share that has grown over the next four censuses to 38.7%, 39.2%, 41% and 43.6% at last count.
- A number of mother tongues other than Hindi have faced a decline in terms of share, though the dip has been marginal in many cases.
- For example, Bengali’s share in the population declined by just 0.14 percentage points from 1971 (8.17%) to 2011 (8.03%).
- In comparison, Malayalam (1.12 percentage points) and Urdu (1.03 points) had higher declines among the mother tongues with at least one crore

speakers in 2011. Punjabi's share, on the other hand, rose from 2.57% to 2.74%.

- At the other end of the scale (among the 22 languages listed in the 8th Schedule of the Constitution) were Malayalam, whose numbers rose by under 59% in four decades, and Assamese, rising just over 71%.

What explains Hindi's high numbers?

- One obvious explanation is that the Hindi is the predominant language in some of the India's most populous states, including Uttar Pradesh, Madhya Pradesh and Bihar.
- Another reason is that a number of languages are bracketed under Hindi by census enumerators.
- In 2011, there were 1,383 mother tongues reported by people, and hundreds were knocked out.
- These mother tongues were then grouped into the languages.
- Under Hindi, they have listed nearly 65 mother tongues.
- Among them is Bhojpuri, and five crore people have reported Bhojpuri as their mother tongue, however the census has decided that Bhojpuri is Hindi.
- If one were to knock out the other languages merged with Hindi, the total figure goes down to thirty eight crore.

And how widely is English spoken?

- Although English, alongside Hindi, is one among the 2 official languages of the central government, it's not among the twenty two languages in the eighth Schedule; it's one of the 99 non-scheduled languages.
- In terms of mother tongue, India had just 2.6 lakh English speakers in 2011 — a tiny fraction of the 121 crore people counted in that census.
- It was the second language of 8.3 crore respondents in 2011, second only to Hindi's 13.9 crore.

- If third language is added, then English was spoken — as mother tongue, second language or third language — by over 10% of the population in 2011, behind only Hindi's 57%.
- It is still not a scheduled language in India, when it should be.

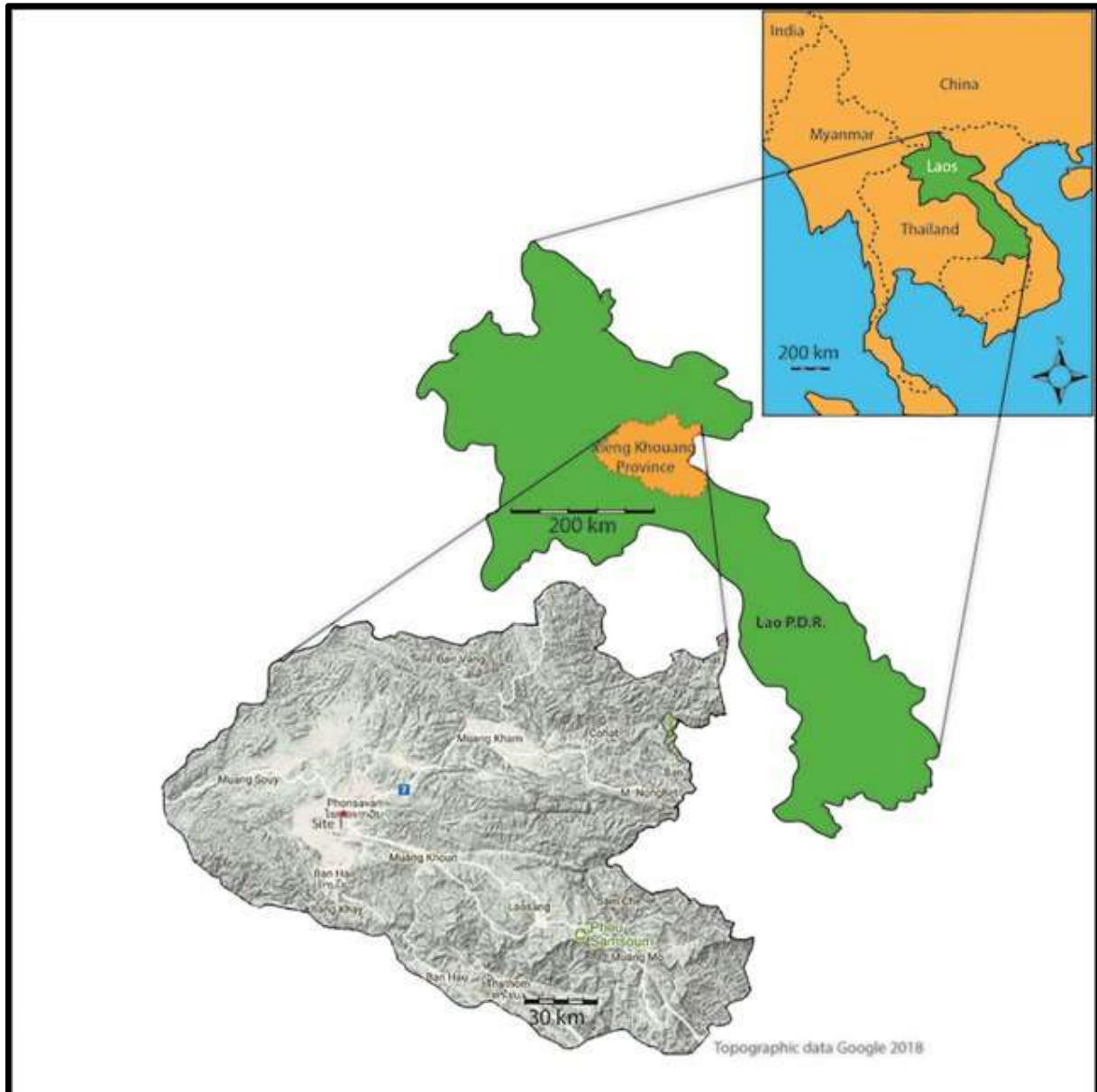
Where is English most prevalent?

- As mother tongue, Maharashtra accounted for over 1 lakh of the 2.6 lakh English speakers.
- As second language, English is preferred over Hindi in parts of the Northeast. Among the 17.6 lakh with Manipuri (an 8th Schedule language) as their mother tongue in 2011, 4.8 lakh declared their second language as English, compared to 1.8 lakh for Hindi.
- Among the non-scheduled languages spoken in the Northeast, Khasi, predominant in Meghalaya, was the mother tongue of 14.3 lakh, of whom 2.4 lakh declared their second language as English, and 54,000 as Hindi.
- The trends were similar for Mizo, and for various languages spoken in Nagaland, including Ao, Angami and Rengma.
- Beyond the Northeastern languages, among sixty eight lakh with Kashmiri as their mother tongue, 2.8 lakh declared their second language as English, compared to 2.2 lakh who declared Hindi.
- Eighth Schedule of the Indian Constitution The Eighth Schedule lists the official languages of the Republic of India.
- At the time when the Constitution was enacted, inclusion in this list meant that the language was entitled to representation on the Official Languages Commission.
- Additionally, a candidate appearing in an examination conducted for public service is entitled to use any of these languages because the medium in which he or she answers the paper.

- As per Articles 344(1) and 351 of the Indian Constitution, the eighth schedule includes the recognition of the twenty two languages.
- Assamese, Bengali, Gujarati, Hindi, Kannada, Kashmiri, Konkani, Malayalam, Manipuri, Marathi, Nepali, Oriya, Punjabi, Sanskrit, Sindhi, Tamil, Telugu, Urdu, Bodo, Santhali, Maithili and Dogri.
- **‘Classical’ languages in India:** Currently, six languages enjoy the ‘Classical’ status: Tamil (declared in 2004), Sanskrit (2005), Kannada (2008), Telugu (2008), Malayalam (2013), and Odia (2014). According to info provided by the Ministry of Culture in the Rajya Sabha in February 2014, the guidelines for declaring a language as ‘Classical’ are: High antiquity of its early texts/recorded history over a period of 1500-2000 years; A body of ancient literature/texts, that is considered a valuable heritage by generations of speakers; The literary tradition be original and not borrowed from the another speech community; The classical language and literature being distinct from the modern, there may also be a discontinuity between the classical language and its later forms o

Topic 24. HOW ANCIENT MEGALITHIC JARS CONNECT ASSAM WITH LAOS AND INDONESIA

Importance for Prelims: Art & Culture



The discovery of a number of the megalithic stone jars in Assam's Dima Hasao district has been brought to focus the possible links between India's Northeast and the Southeast Asia, dating back to the second millennium BC

- According to a study in Asian Archaeology, the jars are a “unique archaeological phenomenon”.

- It calls for more research to understand the “likely cultural relationship” between the Assam and the Laos and Indonesia, the only 2 other sites where similar jars have been found.
- **About the Megalithic Jars:** The jars of Assam were first sighted in 1929 by British civil servants James Philip Mills and John Henry Hutton.
- They recorded their presence in six sites in Dima Hasao: Derebore (now HojaiDobongling), Kobak, Kartong, Molongpa (now Melangpeuram), Ndunglo and Bolasan (now Nuchubunglo).
- Researchers documented three distinct jar shapes (bulbous top with conical end; biconical; cylindrical) on spurs, hill slopes and ridge lines.
- **Significance of these Artefacts:** While the jars are yet to be scientifically dated, the researchers said links could be drawn with the stone jars found in Laos and Indonesia.
- There are typological and morphological similarities between the jars found at all three sites.
- The other takeaway is the link to mortuary practices with human skeletal remains found inside and buried around the jars.
- **About Megalithic Burials in India:** Megaliths were constructed either as burial sites or commemorative (nonsepulchral) memorials.
- Megaliths burial sites are sites with actual burial remains, such as dolmenoid cists (box-shaped stone burial chambers), cairn circles (stone circles with defined peripheries) and capstones (distinctive mushroom-shaped burial chambers found mainly in Kerala).
- The urn or the sarcophagus containing the mortal remains was typically made of terracotta.
- The commemorative megaliths include memorial sites such as menhirs. Taken together, these monuments lend these disparate peoples the common traits of what we know as megalithic culture, one which lasted from the

Neolithic Stone Age to the early Historical Period of (2500 BC to AD 200) across the world.

- In India, archaeologists trace the majority of the megaliths to the Iron Age (1500 BC to 500 BC), though some sites precede the Iron Age, extending up to 2000 BC.
- Megaliths are found in the almost all parts of southern India

Topic 25. UNSCR 1540

Importance for Prelims:IR

Weapons of Mass Destruction (WMD) and their Delivery Systems (Prohibition of Unlawful Activities) amendment Bill, 2022 was passed in the Lok Sabha.

- **Background:** UNSCR 1540 undergoes periodic reviews to determine the success of its implementation and to identify gaps in enforcement.
- In one such review undertaken in 2016, it was concluded that the risk of proliferation to non-state actors is increasing due to rapid advances in science, technology, and international commerce.
- Amendment was necessary to address two specific gaps: First, as the relevant organisations at the international level, such as the Financial Action Task Force have expanded the scope of targeted money sanctions and demand tighter controls on the financing of weapon of mass destruction activities, India's own legislation has been harmonised to align with international benchmarks.
- Secondly, with advancements in technologies, new forms of threats have emerged that weren't sufficiently catered for within the existing legislation.

What is the UNSCR 1540?

- In April 2004 the United Nations security council adopted resolution 1540 to address the growing threat of non-state actors gaining access to weapon of mass destruction material, instrumentality or technology to undertake acts of terrorism.
- In order to address this challenge to international peace and security, UNSCR 1540 established binding obligations on all United Nations member states underneath Chapter VII of the UN Charter.
- Nations were mandated to take and enforce effective measures against proliferation of WMD, their means of delivery and related materials to non-state actors.

- UNSCR 1540 enforced 3 primary obligations upon nation states To not provide any sort of support to non-state actors seeking to acquire weapon of mass destruction, related materials, or their means that of delivery To adopt and enforce laws criminalising the possession and acquisition of such items by non-state actors To adopt and enforce domestic controls over relevant materials, in order to prevent their proliferation.
- Significance of the legislation for India Preventing acts of terrorism that involve WMD or their delivery systems requires building a network of national and international measures in which all nation states are equally invested.
- Such actions are necessary to the strengthen global enforcement of the standards relating to the export of sensitive items and to prohibit even the financing of such activities to ensure that non-state actors, as well as terrorist and illegal networks, don't gain access to such materials.
- Sharing of best practices on legislations and their implementation will enable harmonisation of global weapon of mass destruction controls.
- Having now updated its own legislation, India can demand the same of others, especially from those in its neighbourhood that have a history of proliferation and of supporting terrorist organisations.

Topic 26. UNDERSTANDING SOFTWARE COPYRIGHTS AND CHALLENGES

Importance for Prelims: Science & Tech

How do operating systems license their domains?

What are the different types of software licences?

Software licensing:

- A copyright gives a creator the legal right to own, distribute and profit from his or her creative work.
- There are different kinds of software licences that allow free use of software:
 1. **Proprietary License** There is proprietary software which is to be purchased as a one-time transaction or as yearly licences. A popular example is Microsoft Windows which is purchased along with the computer or Microsoft Office which typically has a yearly licence that has to be renewed upon payment.
 2. **Creative Commons licence (CC)** There is the Creative Commons licence (CC) which is public domain: any software or work that is in CC can be used and distributed free of cost. For example, Wikipedia is under CC and hence its contents can be used freely with the condition that attribution is made to Wikipedia (this is called 'Creative Commons – Attribution-ShareAlike').
 3. **Permissive Software licence** Another form of free software licence is Permissive Software licence which is popular in the software developer community and in the commercial world. This licence allows free use and modification of software. There are further specific licences under this category, like the Apache licence and MIT licence.
 4. **Apache licence** The Apache licence is maintained by the Apache Software Foundation which is a non-profit entity. •Many popular and powerful

softwares like Spark (used in massive Data) are developed under Apache licence. Massachusetts Institute of Technology licence is maintained by the Massachusetts Institute of Technology and it covers hundreds of software packages including GitLab and Dot net.

What are Open Software?

- All free and permissive software licences are similar to Free and Open Source Software (FOSS).
- This is a set of rules and free software brought under one umbrella in the 1980s by Richard Stallman, a famous computer scientist and activist. FOSS maintains its own licence, known as gnu GPL (Gnu's Not UNIX system General Public Licence) to control and distribute free software however it comes with restrictions that its adoption and
- In the software community, 'open source' means any of the above non-proprietary licences.

Who maintains open source softwares?

- Open source software packages are the developed and maintained by programmers from around the world.
- Till the mid-1990s, the idea of the general public collaborating to create software system for free seemed to be unrealistic and confined to small, elite communities.
- However, with the success of a free operating system like UNIX (which is under gnu GPL licence), several were convinced that open source could create sophisticated solutions because of access to top programmers around the world.

Is the Internet free?

- To access and to form content on the internet, there are costs involved such as infrastructure prices like network cost and therefore the cost to host and maintain the content.

- However, the core of the internet itself is free: it's free to use ideas like linking contents on the internet, transferring them with a network software protocol and adopting the associated standards like maintaining the web site address (Uniform Resource Locator-URL).
- Are programming languages free of cost?
- Till the 1980s, popular programming languages had a price however with the advent of Java in the 1990s and due to the initiatives of Richard Stallman and his Free software Foundation in the 1980s, and many languages, especially modern ones like Go or popular ones like Python are free.
- Java is somewhere in the middle wherever there are free implementations of the language that most software developers use however there are paid implementations provided by Oracle.
- Normally, the realisation in the software system community is that a free language has widespread adoption and leads to the availability of an expert pool of programmers.
- The last two decades have seen a proliferation of open source software and the future is even more exciting.

Topic 27. COPYRIGHT ON MUSICAL WORK

Importance for Prelims:Economy



Last week, the Madras high court admitted a plea from composer and lyricist Ilayaraja, challenging a single-bench order that had permanently prevented him from asserting his copyright over his own musical work and master recordings for thirty films of the 1980s.

- **MUSICAL WORK:** A musical work is the composition itself and does not include the lyrics or any sounds.
- It receives the full set of the rights under copyright law, just like the literary, dramatic or the artistic work.
- Usually, a sound recording is based on a musical work and in such cases, the author of sound recording is required to obtain permission from the owner of musical work.
- Definition Section 2(p) of the Act provides that- “musical work” means a work consisting of music and includes any graphical notation of such work but does not include any words or any action intended to be sung, spoken or the performed with the music.

- Author of the musical work According to the section 2(d)(ii) the author in relation to the musical work is a “Composer”.
- Whereas according to section two (ffa) “Composer”, in relation to a musical work, means that the person who composes the music regardless of whether or not he records it in any form of graphical notation.
- An application for Musical Work may also be filed by joint authors/composers. Section 2(z) defines “work of the joint authorship” as a work produced by the collaboration of 2 or more the authors in which the contribution of 1 author isn't distinct from the contribution of the other author or authors; Term of Protection for Musical Works: As per Section 22 of the Act, the term of copyright protection for musical work published within the lifetime of the author till sixty years from the beginning of the yr next following the year in which the author dies.
- In case of joint authorship work, the term shall be counted at or immediately before the date of the death of the author who dies last.
- **DIFFERENCE BETWEEN MUSICAL WORK & SOUND RECORDING**
It has been observed that few of the applicants, while filing the copyright registration applications, face difficulty in differentiating between Musical Works and Sound Recording Works.
- As observed by the Hon’ble Supreme Court in Indian Performing Rights Society v.
- Eastern Indian Motion Pictures Association [AIR1977 SC 1443] “In a musical work “Copyright is not the soulful tune, the super singing, the glorious voice or the wonderful rendering.
- It's the melody or harmony reduced to printing, writing, or graphic form” sound recording has been defined under Section 2(xx) as a recording of sounds from which such sounds is also produced regardless of the medium

on which such recording is made or the method by that the sounds are produced.

- A sound recording Copyright may be claimed in the aggregate of sound embodied in any tangible medium, including phonograph discs, open-reel tapes, cartridges, cassettes, player piano rolls, and other material of objects during which sound are fixed and might be communicated either directly or with the aid of machine or device.
- When a graphical notation of a musical work is recorded in any medium from which sound may be produced, it amounts to Sound Recording.
- The author of a sound recording work is the Producer of the sound recording, as opposed to Composer being the author of Musical Work.
- **About COPYRIGHT: Law** – Copyrights Act 1957, amended in 2012 Ministry – Copyright Office, Ministry of Human Recourse Development Copyright is a bundle of rights given by the law to the creators of literary, dramatic, musical and artistic works and the producers of cinematograph films and sound recordings.
- The rights provided under Copyright law include the rights of reproduction of the work, communication of the work to the public, adaptation of the work and translation of the work.
- Computer Software or programme can also be registered as a ‘literary work’.
- As per Copyright Act, 1957 “literary work” includes computer programmes, tables and compilations, including computer databases. ‘Source Code’ has also to be supplied along with the application for registration of copyright for software products.
- The 2012 amendments make Indian Copyright Law compliant with the internet Treaties – the WIPO Copyright treaty (WCT) and WIPO Performances and Phonograms treaty (WPPT). Copyright for Lifetime of

the author + sixty years from the beginning of the calendar year next following the year in which the author dies.

- Literary Dramatic Musical and Artistic works Until sixty years from the beginning of the calendar years next following the year in which the work is first published Anonymous and pseudonymous works Posthumous work Cinematograph films Sound records Government work Public undertakings International Agencies photographs India has a very large copyright-based creative industry.
- India was the first country to ratify the Marrakesh Treaty 2013 for Access to copyright works for visually impaired persons.

Topic 28. ANTI MICROBIAL RESISTANCE (AMR)

Importance for Prelims: Science & Tech



Strategic framework designed by the four organisations to advance a 1 Health response to AMR

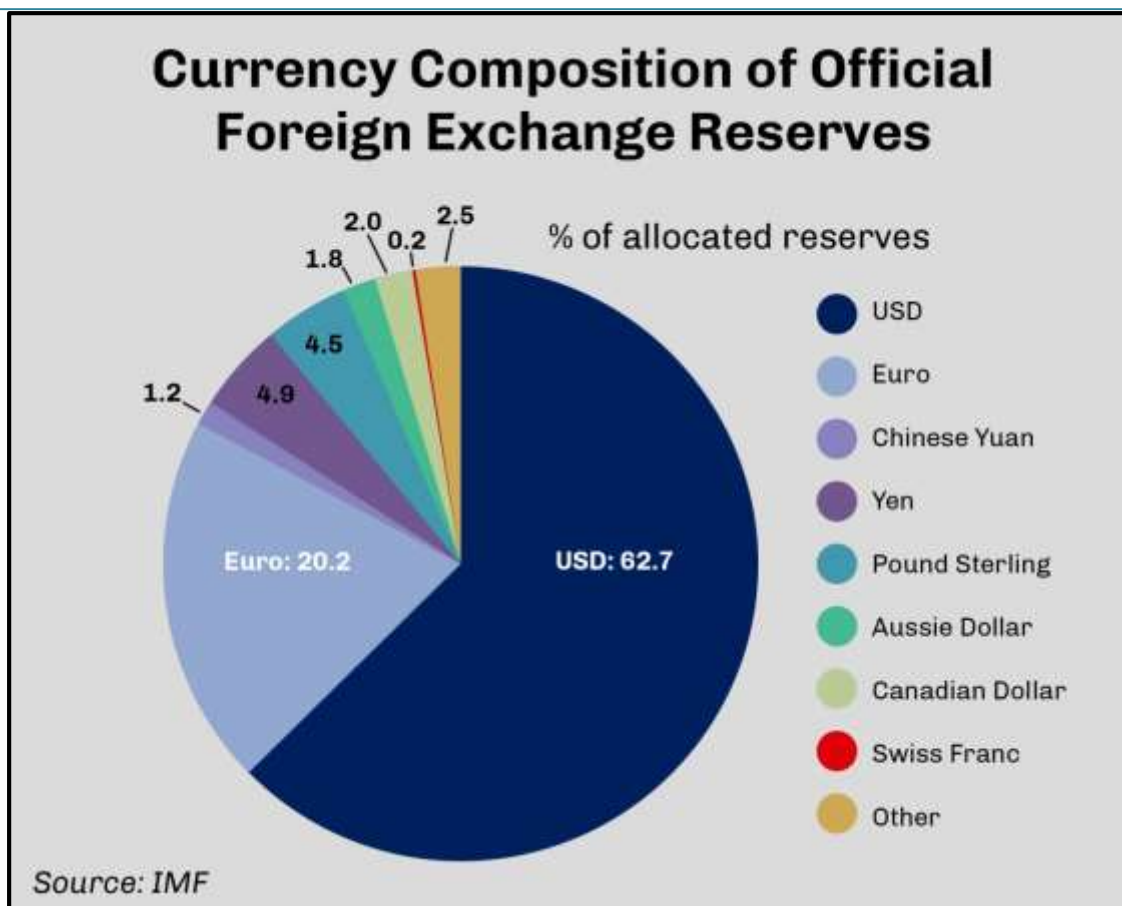
- The strategic framework published in a very report April 6, 2022 to advance a 1 Health response to AMR at the global, regional and country levels could be a joint effort by the World Health Organization (WHO) Food and Agriculture Organisation (FAO) World Organisation for Animal Health (OIE) United Nations Environment Program (UNEP).

- The goal of the strategic framework is to preserve antimicrobial efficacy and ensure sustainable and equitable access to antimicrobials for responsible and prudent use in human, animal and plant health, contributing to achieving the UN-mandated Sustainable Development Goals (SDGs).
- To achieve this goal, the objectives, mentioned in the framework are: Optimize the production and use of antimicrobials along the whole life cycle — from research and development to disposal — and decrease the incidence of infection in humans, animals and plants to reduce the development and spread of AMR.
- Collaboration among countries to have the capacity to the design and the sustainably implement evidence-informed One Health responses to AMR.
- The report defined three outcomes countries should have in place: Policy and law support effective country-owned One Health AMR responses Systems and structures, including institutional capacities, are in place to support effective implementation of country-owned One Health AMR response Increased, sustained resourcing is in place for country-owned One Health AMR responses.
- **About Anti microbial Resources:** Anti microbial resistance is the resistance acquired by any microorganism (bacteria, viruses, fungi, parasite, etc.) against antimicrobial drugs (such as antibiotics, antifungals, antivirals, antimalarials, and anthelmintics) that are used to treat infections.
- • As a result of, standard treatments become ineffective, infections persist and may spread to others.
- Microorganisms that develop antimicrobial resistance are sometimes referred to as “superbugs”.
- Antimicrobial resistance is now regarded as a major threat to public health across the globe.

- **Reasons for AMR:** Antibiotic consumption in humans Access to antibiotics without prescription . Lack of knowledge regarding when to use antibiotics.
- Unnecessary and injudicious use of antibiotic fixed dose combinations may lead to emergence of bacterial strains resistant to multiple antibiotics.
- Social and cultural factors Include self-medication.
- Mass bathing in rivers as part of religious mass gathering occasions.
- Untreated disposal of the sewage water bodies – leading to the contamination of rivers with antibiotic residues and antibiotic-resistant organisms.
- Infection Control Practices in Healthcare Settings Antibiotic Consumption in Food Animals Antibiotics which are critical to human health are commonly used for growth promotion in poultry.
- Pharmaceutical Industry Pollution The wastewater effluents from the antibiotic manufacturing units contain a substantial amount of antibiotics, leading to contamination of rivers and lakes.

Topic 29. RESERVE CURRENCY

Importance for Prelims:Economy



A crypto platform's pledge to amass \$10 billion worth of bitcoin to back its own 'stablecoin' is firing up the market. It's a part of a wider movement to crown bitcoin because the reserve currency of a new age.

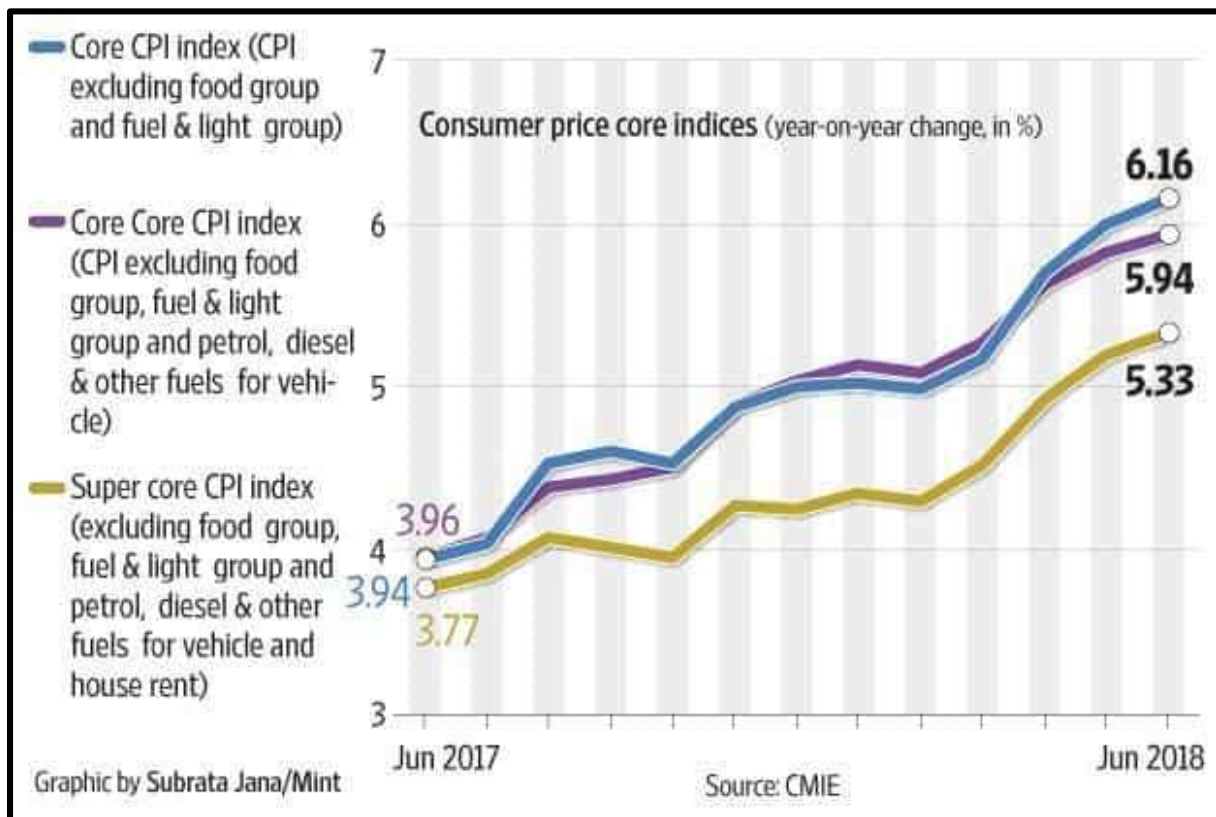
Reserve currency?

- A reserve currency is a foreign currency or precious metal that's held in massive quantities; it may be held by a country's government, central bank, or other monetary authority.
- It's used for participating in the global economy, like through international transactions or investments.
- A reserve currency reduces exchange rate risk since there's no need for a country to exchange its currency for the reserve currency to do trade.
- Reserve currency helps facilitate global transactions, including investments and international debt obligations.

- A large percentage of commodities are priced in the reserve currency, causing countries to hold this currency to pay for these goods.
- Before the mid-20th century, reserves were the mostly gold and silver.
- Modern reserves are typically made up of strong foreign currencies.
- Many of them are specifically designated as reserve currencies by the International Monetary Fund (IMF).
- Starting in the mid-20th century, the U.S. dollar was set because the international reserve currency.
- Backed by the safest of all paper assets, U.S. Treasuries, the USA dollar is still the foremost redeemable currency for facilitating world commerce.
- The U.S. dollar isn't the only reserve currency designated by the IMF and other global organizations.
- The euro, Chinese renminbi, Japanese yen, and British pound sterling are all popular as reserve currencies.
- **Characteristics:** Availability– has the depth and liquidity to allow for reliable and efficient international transactions.
- Acceptability–can be freely and easily exchanged for other currencies. Stability–held by the many monetary authorities and the institutions, in significant amounts.
- **Factors that make a currency useful as a reserve currency:** The size of the economy in the country where that currency comes from International integration of that economy.
- However open its financial markets are The currency's convertibility whether or not it's used as a regional or international currency peg Domestic macroeconomic policies

Topic 30. CORE INFLATION

Importance for Prelims:Economy



Why in the news?

- Retail inflation based on the consumer price index (CPI) surged to almost seven per cent, a 17- month high, in March even without capturing the full impact of the the fuel price hike.
- Core Inflation: Inflation excluding ‘food and beverages’ and ‘fuel and light’ – the transitory components of the consumer price index.
- Conventionally, core inflation is calculated by excluding ‘food and beverages’ and ‘fuel and light’ groups from overall inflation (CPI-C).
- Refined core inflation In the CPI-C these fuel items excluded from core are included in ‘transport and communication’, a subgroup under the miscellaneous group.
- Therefore, conventional ways of calculating retail core inflation, instead of excluding the volatile fuel items from core inflation, continue to include volatile fuel items in core inflation.

- As a result, the fuel price rise continues to impact the core inflation.
- A 'refined' core inflation was constructed to address this anomaly by excluding main fuel items viz., 'petrol for vehicle', 'diesel for the vehicle' and 'lubricants and other fuels for vehicles', in addition to 'food and beverages' and 'fuel and light' from the headline retail inflation Consumer Price Index/Retail Inflation-has several sub-groups: Food and beverages; Pan, tobacco & intoxicants; Clothing & footwear; Fuel and light; Housing and Miscellaneous.
- India's benchmark 10-year government bond on Tuesday rose by another four basis points to hit a new high of 7.19 per cent amid worries over rising inflation and the RBI move to suck out of the liquidity from the system.
- Bond yield and inflation relation: Bonds are units of debt issued by the companies/government and traded like shares.
- As companies/government issues bonds to raise the money, they pay a fixed interest to the bondholders which is popularly known as the coupon rate.
- It is declared upfront and payable on the face value of the bond and remains fixed until maturity.
- As bonds are tradeable, they also offer returns.
- These returns are called bond yields. For example, if an investor buys a 10-year bond worth Rs10,000 with a coupon rate of 5%, he will get an interest of Rs 500 per year But while trading, if the bond price falls to Rs 8,000, your yield will become 6.25% ($\text{Rs}500 / \text{Rs}8000 \times 100$).
- Thus, bond yields and prices move in opposite directions, when bond prices rise, yields fall, and vice versa.
- **Treasury yields move higher as fixed-income products become less desirable:** This causes decrease in demand vis-a-vis supply of bonds causing bond yield to rise.

- Rising inflation pushes bond prices lower, thereby pushing yields higher:
As inflation rises, central banks will increase short-term interest rates in an effort to cool down the economy.
- Additionally, rising inflation expectations lead to an increase in long-term rates, which are largely determined by market activity.
- The inverse relationship between interest rates and bond prices means that higher rates equal lower bond prices.

Topic 31. ICRISAT INVITES AGRI-TECHS TO APPLY FOR FUNDING

Importance for Prelims: Government Schemes

The Agribusiness Incubator (ABI) at the International Crops Research Institute for SemiArid Tropics (ICRISAT) has called for applications from agritech start-ups under the NIDHI-Seed Support Scheme (NIDHI-SSS)

- National Initiative for Developing and the Harnessing Innovations (NIDHI) Background National Initiative for the Developing and Harnessing Innovations (NIDHI) is an umbrella programme conceived and developed by the Innovation & Entrepreneurship division, Department of Science & Technology, Government of India, for nurturing ideas and innovations (knowledge-based and technology-driven) into successful startups.
- The programme would work in line with the national priorities and goals and its focus would be to build an innovation driven entrepreneurial ecosystem with an objective of socio-economic development through wealth and job creation.
- NIDHI aims to nurture start-ups through scouting, supporting and scaling of innovations.
- The key stakeholders of NIDHI includes various departments and ministries of the central government, state governments, academic and R & D institutions, mentors, financial establishments, angel investors, venture capitalists and private sectors.
- NIDHI is developed keeping in line the new national aspirations and on the basis of DST's experience of 3 decades, in promoting innovative start-ups

The key components of NIDHI are –

1. **NIDHI-GCC** – Grand Challenges and the Competitions for the scouting innovations
2. **NIDHI-Promotion and Acceleration of Young and Aspiring technology entrepreneurs (NIDHI-PRAYAS)** – Support from Idea to Prototype

3. **NIDHI-** entrepreneur In Residence (NIDHI-EIR) – support system to reduce risk;
4. **Startup-** NIDHI through Innovation and the Entrepreneurship Development Centres (IEDCs) in the academic institutions; encouraging Students to promote start-ups
5. **Start-up** up Centre in collaboration with MHRD; Inculcating a spirit of entrepreneurship in National institutions of higher Learning
6. **NIDHI-**Technology Business Incubator (TBI) – Converting Innovations to startups
7. **NIDHI-** Accelerator – fast tracking a start-up through focused intervention
8. **NIDHI-** Seed support system (NIDHI-SSS)- Providing early stage investment
9. **NIDHI-** Centres of Excellence (NIDHI-CoE) – A World class facility to help startups go global

Topic 32. WTO SLASHES GLOBAL TRADE GROWTH FORECAST FOR 2022 TO 3% FROM 4.7%

Importance for Prelims: Geography

According to WTO sharp rise in commodity prices has been one of the immediate economic impacts of the crisis. Despite their small shares in world trade and output, Russia and Ukraine are key suppliers of essential goods including food, energy, and fertilisers, supplies of which are now threatened by the war. Grain shipments through black sea ports have already been halted, with potentially dire consequences for food security in poor countries. apart from the ukraine war, the other massive factor affecting prospects of world trade growth was the continued lockdowns in China to prevent the spread of Covid-19. This was the disrupting seaborne trade at a time when the supply chain pressures appeared to be easing. this might lead to renewed shortages of manufacturing inputs and higher inflation .

- The black sea also has a vital strategic significance to Russia. With Russia occupying its northeast shores, it's bordered by six countries – ukraine to the north, Georgia to the east, Turkey to the south and Bulgaria and Romania to the west.
- Three of those nations, Turkey, Bulgaria and Romania, are members of NATO and that is a bone of contention for the Kremlin It is supplied by major rivers, principally the Danube, Dnieper, and Don.
- The black sea ultimately drains into the mediterranean sea, via the Turkish Straits and also the aegean sea.
- The Bosphorus Strait connects it to the small Sea of Marmara which in turn is connected to the Aegean Sea via the Strait of the Dardanelles.
- To the north, the Black Sea is connected to the Sea of Azov by the Kerch Strait.
- The Black Sea covers 436,400 km² (not together with the sea of Azov), making it the world's largest inland body of water.

- Access to the ocean of Marmara, and subsequently the aegean sea and Mediterranean is thru the strait of Istanbul that connects Asia with the rest of Europe.
- The Bosphorus and Dardanelles straits are controlled by Turkey and under the 1936 Montreux Convention, Ankara has the control to close the Bosphorus and Dardanelles straits to all foreign warships in times of conflict.
- Important cities on the coast include Odessa, Varna, Samsun, Sochi, Sevastopol, Constanța, Trabzon, Novorossiysk, Burgas, and Batumi. Black sea ports Port of Constanta Port of Constanta Port of Novorossiysk

Topic 33. INDIA-BANGLADESH TRANS-BOUNDARY RIVER MANAGEMENT: UNDERSTANDING THE TIPAIMUKH DAM CONTROVERSY

Importance for Prelims: Geography



Background: Tipaimukh Dam is a proposed embankment dam on the river Barak in Manipur state India 1st commissioned in 1983.

- The purpose of the dam is flood control and hydroelectric power generation.
 - It has been subject to repeated delays as the project developed, as there has been controversy between India and Bangladesh over water rights
- Controversies related to Dam: Experts feel the massive dam can be disrupt the seasonal rhythm of the river and have an adverse effect on the downstream agriculture and fisheries.
- Tipaimukh area lies in an ecologically sensitive and topographically fragile it's within one among the foremost seismically volatile regions on the planet The region is situated in one among the biodiversity hotspots of not only India however the world.

- It's also the home of the Hmar people, a part of the kuki tribe, whose cultural identity and very lives are intertwined with the river. 2007 Environmental Impact Assessment (EIA) report observed that the project can permanently submerge some 291.5 sq. km. at FRL (275.5 sq. km. in Manipur and 16 sq. km. in Mizoram).
- Barak-Meghna river System the most river rises in the Manipur Hills near LiaiKullen village of northeast India because the Barak river and flows west becoming the Surma and Kushiya river and then flows south because the Meghna river (after the 2 former rivers be a part of again near the north of Bhairab Bazar) to the Bay of Bengal.
- The principal transboundary tributaries of the Barak from India are the Jiri, the Dhaleshwari (Tlawng), the Longai, the Madhura, the Sonai (Tuirial), the Rukni and also the Katakhal. At the border with Bangladesh, 30 km west of Silchar (District Cachar, Assam, India) and near Amalshid (Bangladesh) the river divides with the northern branch called the Surma River and the southern the Kushiya River.
- The Kushiya receives the tributaries from the Sylhet Hills and the Tripura Hills to the south, the principal one from the Tripura Hills being the Manu.
- When the Surma and the Kushiya finally rejoin in Kishoreganj District above Bhairab Bazar, the river is known as the Meghna River

Topic 34. CRUISE MISSILES

Importance for Prelims: Science & Tech



Ukraine, via a telegram post late Wednesday, claimed to have severely damaged the Russian Black Sea Fleet Flagship ‘Moskva’ off the coast of Odessa via a missile strike on the ship.

What is the type of cruise missile that hit the Moskva?

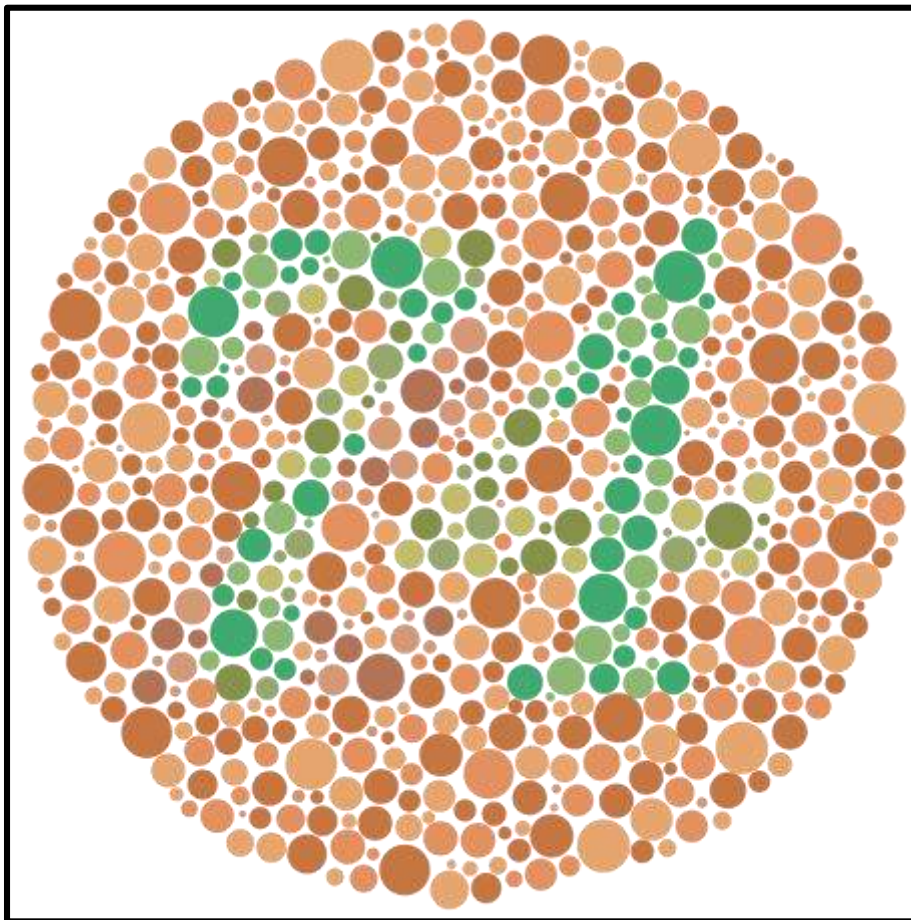
- The Ukrainians claim that the Moskva was hit by two anti-ship cruise missiles called the Neptune.
- Ironically, the design of this missile is based on a Russian Kh-35 cruise missile which goes by the NATO name of AS-20 Kayak.
- According to the Ukrainian Ministry of Defence, the Neptune is a coastal anti-ship cruise missile which is capable of destruction of naval vessels in a range of three hundred km.

What is Moskva, the ship that was hit by the missile?

- Moskva is a guided missile cruiser of the Russian Navy named after the city of Moscow.
- It is the flagship of the Black Sea Fleet of the Russian Navy and carries a crew of around five hundred personnel.
- The Moskva was originally commissioned as the Slava in 1983.
- It was recommissioned in 2000 as the Moskva with refurbished weapon systems and electronics.
- **About Cruise Missiles:** A cruise missile either locates its target or has a preset target.
- It navigates using a guidance system — such as inertial or beyond visual range satellite GPS guidance — and comprises a payload and aircraft propulsion system.
- Cruise missiles can be launched from land, sea or air for land attacks and anti -shipping purposes, and can travel at subsonic, supersonic and hypersonic speeds.
- Since they stay relatively close to the surface of the earth, they can't be detected easily by anti-missile systems, and are designed to carry large payloads with high precision.
- **Cruise Missile vs Ballistic Missile:** Cruise Missile Ballistic Missile Follows a straight trajectory of motion.
- Travel in projectile motion and trajectory depends on gravity, air resistance and Coriolis Force.
- The flight path is within the earth's atmosphere. Leave the earth's atmosphere and re enter it.
- Short range missiles (range upto 1000 km) Long-range missiles (300 km to 12,000 km) E.g.BrahMos missiles E.g. Prithvi I, Prithvi II, Agni I, Agni II and Dhanush missiles.

Topic 35. COLOUR BLINDNESS

Importance for Prelims: Science & Tech



The Supreme Court has directed the Film and television Institute of India (FTII) to not exclude candidates suffering from colour blindness from its courses on film making and editing and asked it to make the changes to its curriculum instead.

What is colour blindness?

- Colour blindness, also called colour deficiency, is that the inability to see colours in the normal way.
- Individuals blind people often cannot distinguish between certain colours— sometimes greens and reds, and generally blues as well.
- Two types of cells in the retina detect light — the “rods”, which distinguish between light and dark, and the “cones” that detect colour.
- There are three types of cones that see colour — red, green, and blue — and our brains use the information from these cells to perceive colour.

- Colour blindness can be the result of the absence of 1 or more of those cone cells, or their failure to work properly.
- In a situation where all three cone cells are present but one of them is malfunctioning, mild colour blindness may occur.
- Colour blindness may be of various types and degrees.
- Gently colour blind people usually see all colours properly only if the light is good; there are others who cannot tell one colour apart from the another no matter how good the light is.
- In the most severe kind of colour blindness, vision is black-and-white, that is, everything appears as a shade of grey.
- This is not very common.
- Colour blindness cannot heretofore be treated or reversed.
- However, it can be corrected to some extent by wearing special contact lenses or colour filter glasses.
- There's some research that suggests gene replacement therapy will help modify the condition.
- **What causes colour blindness:** Most colour blind people are born with the condition (congenital colour blindness), but some can develop it later in life.
- Congenital colour vision deficiencies are sometimes passed on genetically.
- A problem with colour vision that arises later in life could be the results of disease, trauma, or ingested toxins.
- If colour blindness arises out of disease, one eye may be affected differently from the other, and the difficulty could worsen over time.
- Medical conditions that may be increase the risk of the getting colour blindness include glaucoma, diabetes, Alzheimer's, Parkinson's, alcoholism, leukaemia, and sickle-cell anaemia.

Who is at risk?

- Men suffer from a higher incidence of colour blindness than women.
- Around the world, every tenth male is estimated to have some form of colour deficiency. Men of Northern European descent are especially to be the particularly vulnerable.

Topic 36. RASHTRIYA GRAM SWARAJ ABHIYAN

Importance for Prelims: Government schemes



Rashtriya Gram Swaraj Abhiyan

Strengthening Governance Capabilities of PRIs* to achieve SDGs**

PM Narendra Modi launches Rashtriya Gram Swaraj Abhiyan on 24th April 2018



2.55 lakh PRIs across the country to deliver Sustainable Development Goals

Extend to all States and Union Territories and also rural local institutions where PRIs do not exist



To be implemented from 01-04-2018 to 31-03-2022

Allocation of ₹ 7255.50 cr with Central share of ₹ 4500 cr and State share of ₹ 2755.50 cr



Schemes include Central Components - National Plan of Technical Assistance, Mission Mode project on e-Panchayat and Incentivization of Panchayats and State Component - Capacity building of PRIs



*Panchayati Raj Institutions **Sustainable Development Goals

The government on Wednesday approved ₹ 5,911 crore for the Rashtriya Gram Swaraj Abhiyan (RGSA) which can focus on empowering elected representatives of panchayati raj institutions for leadership roles and help 2.78 lakh rural native bodies achieve the sustainable development goals.

- About Rashtriya Gram Swaraj Abhiyan Rashtriya Gram Swaraj Abhiyan (RGSA) was launched on 24th April 2018 as an umbrella scheme of the Ministry of Panchayati Raj, Govt. of India. It is a unique scheme proposed to develop and strengthen the Panchayati raj System across india in the rural areas.

- It is a centrally sponsored scheme Objectives of RGSA Develop governance capabilities of PRIs to deliver on the SDGs.
- Enhance capabilities of Panchayats for inclusive local governance with focus on optimum utilization of available resources and convergence with other schemes to address issues of national importance.
- Enhance capabilities of Panchayats to raise their own sources of revenue. Strengthen Gram Sabhas to function effectively because the basic forum of people's participation, transparency and accountability within the panchayat system.
- Promote devolution of powers and responsibilities to Panchayats according to the spirit of the Constitution and PESA Act 1996.
- Develop a network of the institutions of excellence to support the capacity building and handholding for PRIs.
- Strengthen institutions for capacity enhancement of PRIs at various levels and enable them to achieve adequate quality standards in infrastructure, facilities, human resources and outcome based mostly training.
- Promote e-governance and other technology driven solutions to enable good governance in Panchayats for administrative efficiency and improved service delivery.
- Coverage RGSA will extend to all States and Union Territories (UTs) of the country.
- For the purpose of these guidelines, wherever 'Panchayats' are mentioned, these will include institutions of rural local government in non-Part IX areas.

Topic 37. CAG REPORT ON PRESERVATION AND CONSERVATION OF MONUMENTS AND ANTIQUITIES

Importance for Prelims: Polity

A 2013 report by CAG on “Preservation and Conservation of Monuments and Antiquities” flags the inefficiency of the archaeological Survey of India (ASI).

- Monuments and antiquities are a part of our heritage and culture and can't be marketed adequately.
- Excavation and the preservation require distinct skill-sets and expertise.
- As per the 2013 report, during physical inspections 131 antiquities were stolen from monuments/sites and 37 antiquities from Site Museums from 1981 to 2012.
- Worldwide, organisations took many more effective steps including checking of catalogues of international auction house(s), posting news of such theft on websites, posting information about theft in the International Art Loss Registry, sending photographs of stolen objects electronically to dealers and auction houses and intimate scholars in the field.
- But the ASI had never participated or collected information on Indian antiquities put on sale at well-known international auction houses viz.
- Sotheby's, Christie's, etc. as there was no explicit provision in the AAT (Antiquities and Art Treasures) Act, 1972 for doing thus.
- The ASI was also a nodal agency to retrieve stolen or illegally exported art objects. From 1976 to 2001, nineteen antiquities had been retrieved by the ASI from foreign countries either through legal means, indemnity agreement, voluntary action or the through out of case settlement. but after 2001, the ASI had not been able to achieve any success because of discretion and abuse in granting non-antiquity certificates for exports.

- India is a signatory to the 1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property (ratified it in 1977).
- Perhaps there is a need to sign the 1995 UNIDROIT (International Institute for the Unification of Private Law) Convention on Stolen or Illegally Exported Cultural Objects.
- Steps taken by the India to preserve and the conserve monuments and antiquities include:
 1. Article fifty one A (f)- “It shall be the duty of the every citizen of India to value and preserve the rich heritage of our composite culture.”
 2. Article 49- to protect monuments, places and objects of national importance.
 3. Ancient Monuments and Archaeological Sites and Remains (AMASR) Act of 1958 AAT(Antiquities and Art Treasures) Act, 1972– to effectively control movable cultural property consisting of antiquities and art treasures.
 4. Antiquities Export Control Act, 1947 – regulate the export of antiquities
 5. National Mission on Monuments and Antiquities, 2007– prepare a national register to document antiquities from different sources in a uniform format.

Topic 38. COAL SHORTAGE

Importance for Prelims: Governance



COAL SHORTAGE AND INDIA'S LOOMING POWER CRISIS

WHY IS THERE A COAL SHORTAGE?

- 108 of 173 thermal power plants have critically low levels of stock
- Power demand is hitting record highs due to economic recovery after COVID-19
- Some imported coal-based power plants are not in production due to high international prices of coal
- surges and a major heatwave spell across India



According to the National Power Portal, of the fourteen imported coal-based power plants, eleven have critical stocks as on April twelve.

- Their daily stock requirement is 1.53 lakh tonnes and they have 1.48 MT stocks, which will last for 9.6 days.
- National Power Portal National Power Portal is one of the many e-governance initiatives of National Informatics Centre (NIC).
- NPP is designed, developed and hosted by National informatics Centre, Ministry of electronics & info Technology, Government of India.
- The portal is a step towards automating various processes related to the generation, transmission and distribution of Power across India.
- It's also facilitated continuous monitoring of aggregate technical and commercial losses (AT&C) losses which has led to reduction of AT&C loss.
- The Central Electricity Authority is that the nodal agency for its implementation.
- The major stakeholders of the NPP are the Ministry of Power, Central Electricity Authority (CEA), Power Finance Corporation (PFC), Rural Electrification Corporation (REC), Generation Utilities (GENCOs), Transmission Utilities (TRANSCOs), and Distribution Utilities (DISCOMs).
- The NPP portal has been designed and developed using open source technologies.
- SMS and the email services are used to be send alerts, messages to utilities to improve and expedite the data entry process.
- National Power database management System (NPDMS), a core backend system of unified NPP is used to capture online information via Apis and web enabled forms from generation, transmission and distribution utilities across the country.
- NPDMS is embedded with Role based Access control (RBAC) to provide restricted access as per role assigned to various utilities.

- Various APIs under NPDMS have also been published to provide important power sector information to various utilities and many are in the pipeline to fulfill the requirements of NITI Aayog.
- **Other Coal Acts:** The Mineral Laws (AMENDMENT) Act, 2020 amends the Mines and Minerals (Development and Regulation) Act, 1957 and to amend the Coal Mines (Special Provisions) Act, 2015.
- Allocation of the coal blocks for the composite prospecting license-cum-mining lease Provision for requirement of Approval from Centre – Done away, in cases where the allocation or the reservation of coal/lignite block has been made by the Central Govt. itself The Coal Mines (Special Provisions) Act, 2015 provides for allocation of coal mines and vesting of the right, title and interest in and over the land and mine infrastructure together with mining leases to successful bidders and allottees with a view to ensure continuity in coal mining operations and production of coal, and for promoting optimum utilisation of coal resources consistent with the requirement of the country in national interest and for matters connected therewith or incidental thereto.
- The Coal India (Regulation of Transfers and Validation) Act, 2000 empower the Central Government to direct the transfer of the land, or of the right, title and interest in relation to a coal mine, coking coal mine or coke oven plant, vested in the Coal India limited or in a subsidiary company to any subsidiary company of Coal India Limited or any other subsidiary company and to validate certain transfers of such land or rights.
- The Coal Bearing Areas (Acquisition and Development) Act, 1957 establish in the economic interest of the India greater public control over the coal mining industry and it is development by providing for the acquisition by the State of the unworked land containing or likely to contain coal deposits or of rights in or over such land, for the

extinguishment or modification of such rights accruing by the virtue of any agreement, lease, licence or otherwise, and for matters connected therewith.

- The Coal Mines (Conservation and Development) Act, 1974 provide for the conservation of coal and development of coal mines and for matters connected therewith or incidental thereto.
- The Coal Mines Provident Fund and the Miscellaneous Provisions Act, 1948 The Coal Grading Board (Repeal) Act, 1959

Topic 39. LONG PERIOD AVERAGE

Importance for Prelims: Geography

The IMD's prediction of a normal monsoon on Thursday was based on the LPA of the 1971-2020 period, during which India received 87 cm of rain for the entire country on average.

- The IMD predicts a “normal”, “below normal”, or “above normal” monsoon in relation to a benchmark “long period average” (LPA).
- According to the IMD, the “LPA of rainfall is the rainfall recorded over a particular region for a given interval (like month or season) average over a long period like 30 years, 50 years, etc”.
- The IMD's latest prediction of a normal monsoon was based on the LPA of the 1971-2020 period, throughout which india received eighty seven cm of rain for the entire country on average.
- The IMD has in the past calculated the LPA at eighty eight cm for the 1961-2010 period, and at eighty nine cm for the period 1951-2000.
- Whereas this quantitative benchmark refers to the average rainfall recorded from June to September for the entire country, the amount of rain that falls every year varies from region to region and from month to month.
- Therefore, along with the countrywide figure, the IMD also maintains LPAs for every meteorological region of the country — this number ranges from around 61 cm for the drier Northwest India to more than 143 cm for the wetter East and Northeast India.
- **Why LPA is needed:** The IMD records rainfall data at more than 2,400 locations and 3,500 rain-gauge stations.
- Because annual rainfall can vary greatly not just from region to region and from month to month, but also from year to year within a particular region or month, an LPA is needed to smooth out trends so that a reasonably accurate prediction will be made.

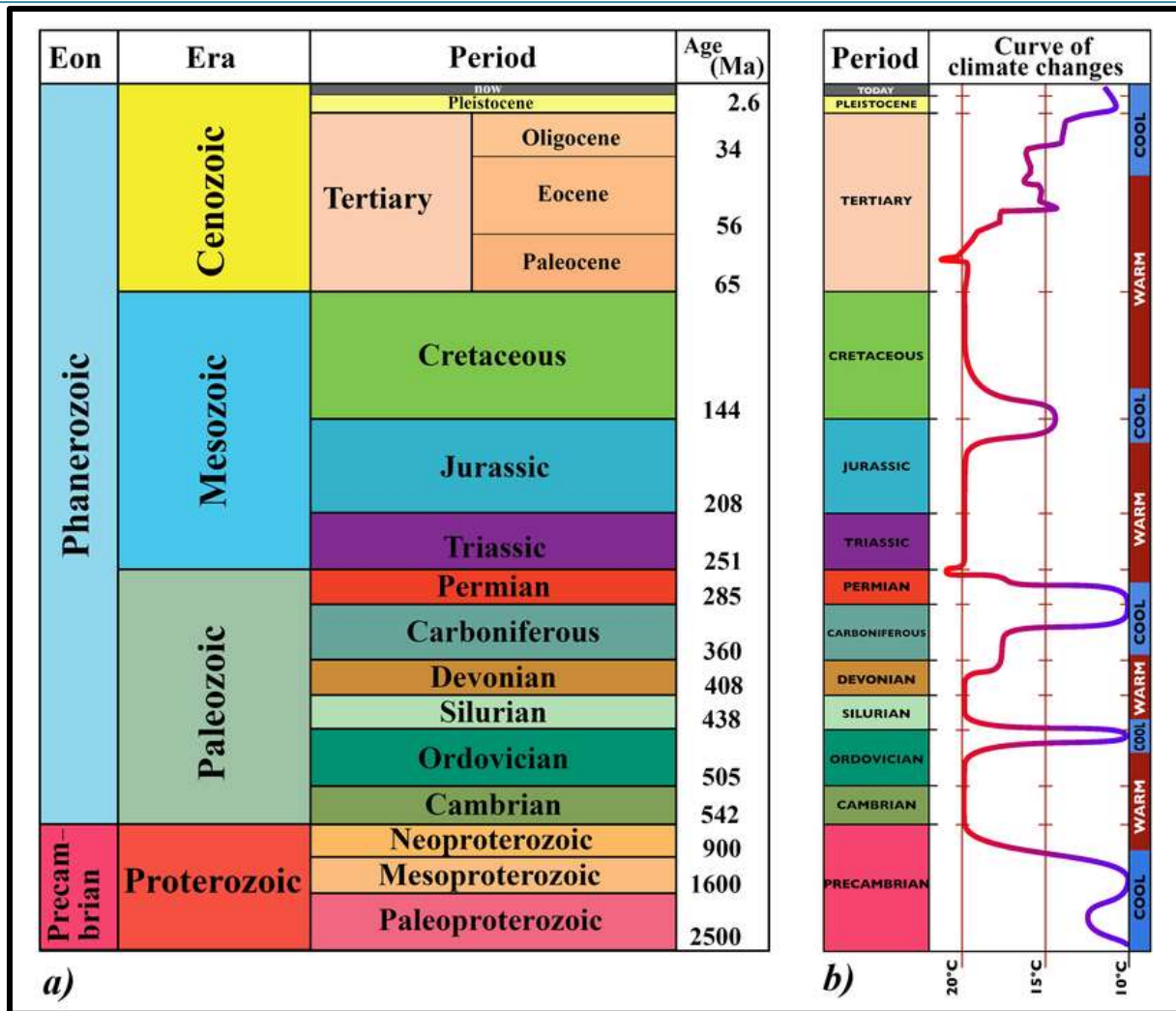
- A 50-year LPA covers for large variations in either direction caused by freak years of unusually high or low rainfall (as a result of events such as El Nino or La Nina), as well as for the periodic drought years and the increasingly common extreme weather events caused by climate change.
- **Range of normal rainfall:** In its forecast on Thursday, the IMD said: “Southwest monsoon seasonal (June to September) rainfall over the country as a whole is most likely to be normal (96 to 104% of LPA.
- The IMD maintains 5 rainfall distribution categories on an all-India scale.

These are:

1. Normal or near normal, when the percentage departure of actual rainfall is $\pm 10\%$ of LPA, that is, between 96-104% of LPA;
 2. Below normal, when departure of actual rainfall is less than 10% of LPA, that is 90-96% of LPA;
 3. Above normal, when actual rainfall is 104-110% of LPA;
 4. Deficient, when departure of actual rainfall is less than 90% of LPA; and
 5. Excess, when the departure of actual rainfall is more than 110% of LPA.
- **About India Meteorological Department:** IMD was established in 1875.
 - It's an agency of the Ministry of Earth Sciences of the govt of India.
 - It's the principal agency responsible for meteorological observations, weather forecasting and seismology.

Topic 40. INTERNATIONAL COMMISSION ON STRATIGRAPHY

Importance for Prelims: Science & Tech



Humans will be to have to own a new geological epoch named after the species — an unfortunate event denotative of our irreversible impact on the planet’s ecosystems

- The Anthropocene Epoch is an unofficial unit of geologic time, used to describe the foremost recent period in Earth’s history when human activity started to have a significant impact on the planet’s climate and ecosystems.
- The word Anthropocene is derived from the Greek words anthropo, for “man,” and cene for “new,” coined and made popular by biologist Eugene Storer and chemist Paul Crutzen in 2000.
- Scientists still debate whether the Anthropocene is different from the Holocene, and the term has not been formally adopted by the International

Union of Geological Sciences (IUGS), the international organization that names and defines epochs.

- The first question that the IUGS needs to answer before declaring the Anthropocene an epoch is that if humans have changed the earth system to the point that it's reflected in the rock strata.
- A popular theory is that it began at the start of the Industrial Revolution of the 1800s, when human activity had a great impact on carbon and methane in Earth's atmosphere.
- Others think that the beginning of the Anthropocene should be 1945. This is when humans tested the first atomic bomb, and then dropped atomic bombs on Hiroshima and Nagasaki, Japan.
- The resulting radioactive particles were detected in soil samples globally.
- Geological time scale Earth's history is divided into a hierarchical series of smaller chunks of time, referred to because of the geological time scale.
- These divisions, in descending length of time, are called eons, eras, periods, epochs, and ages.
- These units are classified based on Earth's rock layers, or strata, and the fossils found within them.
- From examining these fossils, scientists know that certain organisms are characteristic of certain parts of the geologic record.
- The study of this correlation is called Officially, the current epoch is called the Holocene, which began 11,700 years ago after the last major ice age.
- International Union of Geological Sciences (IUGS) The International Union of Geological Sciences (IUGS) is an international nongovernmental organization devoted to international cooperation in the field of geology.

- The International Union of geological Sciences (IUGS), founded in 1961, with 121 national members, representing over a million geoscientists, is one of the World's largest scientific organizations.
- It encourages international co-operation and participation in the Earth sciences in relation to human welfare and is a member of the International Science Council (ISC).
- Membership is open to the countries or defined the regions. International Commission on the Stratigraphy The International Commission on Stratigraphy (ICS), generally referred to the unofficially because the "International Stratigraphic Commission", is a daughter or major subcommittee grade scientific daughter organization that concerns itself with stratigraphical, geological, and the geochronological matters on a global scale.
- It's the largest and oldest subordinate body of the International Union of geological Sciences (IUGS).
- The ICS is essentially a permanent working subcommittee, that meets much more regularly than the quadrennial meetings scheduled by the IUGS, when it meets as a congress or membership of the whole.
- It is the official keeper of geologic time, i.e. it precisely defines units (periods, epochs, and age) of the geological time Scale.
- The International Commission on Stratigraphy (ICS) is the largest and oldest scientific body in the International Union of Geological Sciences (IUGS).
- It is the official keeper of geologic time, i.e. it precisely defines units (periods, epochs, and age) of the Geologic Time Scale.

What is Geological Time Scale?

- Geologists divide the 4.6-billion-year existence of Earth into slices of time such as Eon, Era, System/Period, Series/Epoch, and Stage/Age.

- Eons are divided into Eras, Eras into Periods, Periods into the Epochs, and Epochs into the Ages.
- every slice corresponds to significant happenings – such as the break-up of continents, dramatic shifts in climate, and even the emergence of particular kinds of animals and plant life

Topic 41. ORS

Importance for Prelims: National bodies

Misuse of 'ORS' on the beverage labels: FSSAI asks State food safety commissioners to take action

- The Food Safety and Standards Authority of India (FSSAI) has directed State food safety commissioners to take action against the brands that are misusing the term Oral Rehydration Salts (ORS) on the labels of beverage products.
- Terming it as a case of misbranding, the regulator said such products, labelled with terms containing ORS, are misleading for consumers and could be harmful for patients.
- The food safety authority said it's received complaints that some fruit-based and non-carbonated ready-to-drink beverage manufacturers use terms like ORSL, ORSL Rehydrate, and Electro and ORS, among others, which are similar to ORS.
- The use of term 'ORS' or similar to 'ORS' and/or depiction of the food products as 'ORS' on their labels or through advertisement is not allowed under the food safety and standards regulations, and use of such terms may render the products as 'misbranded food', which may render such FBOs liable for punishment under Section 52 and Section 53 of the Food Safety and Standards Act, 2006.
- The regulator stated that ORS is governed under the drugs and Cosmetics Rules, which is used for the treatment of acute diarrhoea and needs to have a specific composition prescribed by the Drugs Controller General of India.
- **About FSSAI:** Food Safety and Standards Authority of India (FSSAI) is an autonomous statutory body established under the Food Safety and Standards Act, 2006 (FSS Act). Ministry of Health & Family Welfare, Government of India is the administrative Ministry of FSSAI with its Headquarters in Delhi.

- Various acts were subsumed & repealed after commencement of FSS Act, 2006.
- Prevention of Food Adulteration Act, 1954 Fruit Products Order, 1955 Meat Food Products Order, 1973 Vegetable Oil Products (Control) Order, 1947 Edible Oils Packaging (Regulation) Order 1988 Milk and Milk Products Order, 1992 FSSAI is responsible for protecting and promoting public health through the regulation and supervision of food safety.

Topic 42. WILDLIFE PROTECTION (AMENDMENT) BILL 2021

Importance for Prelims:Environment



BACKGROUND

1887

The Wild Birds Protection Act was passed by the British India Government

1912

A second law was enacted in 1912 called the Wild Birds and Animals Protection Act. This act was amended in 1935.

1960

There is a rising issue for protection of wildlife and the prevention of certain species from becoming extinct came into the limelight.

1972

'forests' part from state subject was shifted to **Concurrent List** by passing the **Wildlife Protection Act, 1972**

Article 48A of the Constitution of India directs the State to protect and improve the environment and safeguard wildlife and forests

OBJECTIVES

- Prohibition of hunting
- Protection and management of wildlife habitats
- Establishment of protected areas
- Regulation and control of trade in parts and products derived from wildlife
- Management of zoos

The parliamentary panel has urged the Union government to remove the controversial clause in the Wildlife (Protection) Amendment Bill, 2021 that overrides the original Act, making an exception only for elephants.

- The amended Bill was introduced in the Lok Sabha on December 17, 2021 and was referred to the parliamentary panel on December twenty five.
- The panel will hold a final round of meeting on Monday on its report on the legislation.
- **Section 43 of the principal Act clearly states:** “No person having in his possession captive animal, the animal article, trophy or the uncured trophy in respect of the which he has a certificate of ownership shall transfer by way of sale or offer for sale or by any other mode of the consideration of commercial nature, such animal or article or trophy or uncured trophy.”
- The amended Bill introduces an exemption clause for elephants.
- **The exemption clause to Section 43 says** “This section shall not apply to the transfer or transport of any live elephant by a person having a certificate of ownership, where such person has obtained prior permission from the State government on fulfilment of such conditions as may be prescribed by the Central Government.
- **Wildlife (Protection) Act, 1972:** The Act was enacted for the protection of plants and animal species.
- It has six schedules that give varying degrees of protection.
- Schedule I and part II of Schedule II provide absolute protection – offenses under these are prescribed the highest penalties.
- Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower.
- Schedule V includes the animals which may be hunted.
- The specified endemic plants in Schedule VI are prohibited from cultivation and planting.
- The hunting to the Enforcement authorities has the power to compound offenses under this Schedule (i.e. they impose fines on the offenders). The act has been amended in 1982, 1986, 1991, 1993, 2002, 2006 and 2013.

Topic 43. FDI TRENDS

Importance for Prelims:Economy

Why in the news?

India is expected to attract \$100 billion foreign direct investment (FDI) in 2022-23 on the back of economic reforms and easy doing business in recent years,

industry chamber PHDCCI said on Thursday. It has suggested a ten pronged strategy to strengthen the economic growth and achieve the target of becoming a \$5 trillion economy in next five years. The suggestions include speedy infrastructure investments, inclusion of a lot of sectors under the PLI scheme, increase in public investments in agriculture sector, addressing the high commodity prices and shortages of raw materials.

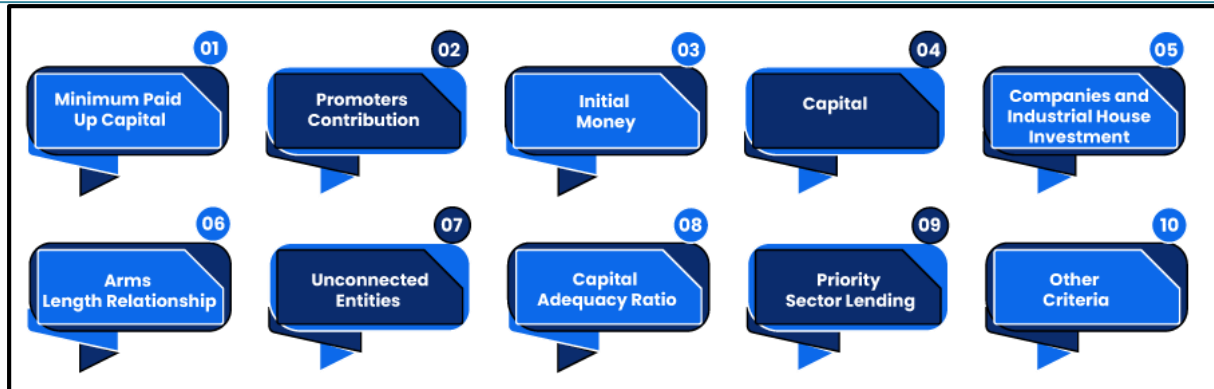
- Any investment from an individual or firm that is located in a foreign country into a country is called Foreign Direct Investment Generally, FDI is when a foreign entity acquires ownership or the controlling stake in the shares of a company in the one country, or establishes businesses there.
- It's different from foreign portfolio investment wherever the foreign entity merely buys equity shares of a company.
- Three Components: Equity capital is the foreign direct investor's purchase of shares of an enterprise in a country other than its own.
- Reinvested earnings comprise the direct investors' share of earnings not to distributed as dividends by affiliates, or the earnings not remitted to the direct investor.
- Such retained profits by affiliates are reinvested. Intra-company loans or intra-company debt transactions refer to short- or longterm borrowing and lending of funds between direct investors (or enterprises) and affiliate enterprises.
- **Routes through which India gets FDI:**
 - **Automatic Route:** In this, the foreign entity does not require the prior approval of the government or the RBI.
 - **Government Route:** In this, the foreign entity has to take the approval of the government.
- • The Foreign Investment Facilitation Portal (FIFP) facilitates the single window clearance of the applications that are through approval route.

- • it's administered by the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry.
- **Trends:** India has received Foreign Direct Investment (FDI) inflows worth USD 339.55 billion in the last five years.
- • It increased from USD 45.15 billion in 2014-15 to USD 81.97 billion in the year 2020-21.
- • As per the world Investment Report 2021 by the United Nations Conference on Trade and Development (UNCTAD), India was the fifth-largest recipient of Foreign Direct Investment (FDI) inflows in the world in 2020.
- In the Financial Year 2020-21, India sees growth of 10% (to \$82 bn) in Foreign Direct Investment (FDI).
- FDI equity investments rose 19% to \$60 billion.
- In April 2020, the DPIIT came out with a new rule, which stated that the entity of any company that shares a land border with India or where the beneficial owner of investment into India is situated in or could be a citizen of such a country will invest only under the govt. route. In other words, such entities will only invest following the approval of the govt. of India.
- • fiscal year 2021-22 Foreign Investment, consisting of foreign direct investment (FDI) and foreign portfolio investment (FPI), is the largest component of the capital account.
- Falling short of the pre pandemic level, the net foreign investment inflows (FIIs) – primarily driven by FDI – moderated to US\$ 25.4 billion in H1: FY 22 compared to corresponding period of FY 21.
- Total foreign direct investment (FDI) inflow to India declined to \$74.01 billion in the calendar year 2021 a decline of 15 percent as compared to calendar year 2020, Sectors attracting highest FDI Equity Inflows- Computer Software & Hardware> Automobile Industry> Services Sector>

Trading > Telecommunications Top FDI investing
countries Singapore>U.S.A.>Mauritius>Netherlands>Japan

Topic 44. CONVERSION OF NBFC INTO BANKS

Importance for Prelims: Economy



Tightening regulatory norms on the non-banking finance companies (NBFCs)

- What are NBFCs A Non-Banking Financial Company (NBFC) is a company registered under the Companies Act, 1956 engaged in the business of loans and advances, acquisition of shares/stocks/bonds/debentures/securities issued by Government or local authority or other marketable securities of a like nature, leasing, hire-purchase, insurance business, chit business however doesn't include any institution whose principal business is that of the agriculture activity, industrial activity, purchase or the sale of any goods (other than securities) or providing any services and sale/purchase/construction of immovable property.
- A non-banking institution that could be a company and has principal business of receiving deposits under any scheme or arrangement in one lump sum or in instalments by way of contributions or in the any other manner, is also the non-banking financial company (Residuary non-banking company).
- financial activity as principal business is when a company's financial assets constitute more than fifty per cent of the total assets and income from financial assets constitute more than 50 per cent of the gross income.
- A company which fulfils both these criteria will be registered as NBFC by RBI.
- The term 'principal business' isn't defined by the reserve bank of India Act.

- The Reserve bank Reserve Bank of India has defined it therefore as to make sure that only companies predominantly engaged in financial activity get registered with it and are regulated and supervised by it.
- Therefore if there are companies engaged in agricultural operations, industrial activity, purchase and sale of goods, providing services or purchase, sale or construction of immovable property as their principal business and are doing some financial business in a small way, they'll not be regulated by the reserve bank.
- Interestingly, this test is popularly known as 50-50 test and is applied to determine whether or not a corporation is into financial business.

What is difference between banks & NBFCs?

- NBFCs lend and make investments and hence their activities are akin to that of banks; however there are a few differences as given below:
 1. NBFC cannot accept demand deposits
 2. NBFCs do not form part of the payment and settlement system and cannot issue cheques drawn on itself
 3. Deposit insurance facility of the Deposit Insurance and the Credit Guarantee Corporation is not available to the depositors of NBFCs, unlike in case of banks.
- 4. Is it necessary that every NBFC should be registered with RBI?**
 - In terms of Section 45-IA of the Reserve Bank of India Act, 1934, no Non-banking financial company will commence or carry on business of a non-banking financial institution without a) obtaining a certificate of registration from the Bank and while not having a net owned Funds of ₹ twenty five lakhs (₹ 2 crore since April 1999).
 - However, in terms of the powers given to the Bank, to obviate dual regulation, certain categories of NBFCs which are regulated by are regulators square measure exempted from the requirement of registration

with Reserve Bank of India viz. venture capital Fund/Merchant Banking and corporations/Stock broking companies registered with the SEBI, insurance company holding a valid Certificate of Registration issued by IRDA, Nidhi corporations as notified under Section 620A of the Companies Act, 1956, Chit companies as defined in clause (b) of Section 2 of the Chit Funds Act, 1982, Housing Finance Companies regulated by National Housing Bank, Stock Exchange or a Mutual Benefit company.

What are the requirements for registration with RBI?

- A corporation incorporated under the companies Act, 1956 and desirous of commencing business of non-banking financial institution as defined under Section 45 I(a) of the Reserve Bank of India Act, 1934 should comply with the following: 1. it should be a company registered under Section 3 of the companies Act, 1956 2.
- It should have been a minimum net owned fund of ₹ 200 lakh.
- (The minimum net owned fund (NOF) required for specialized NBFCs like NBFC-MFIs, NBFC-Factors, CICs is indicated separately in the FAQs on specialised NBFCs)

Topic 45. PRUDENTIAL NORMS

Importance for Prelims:Economy

Non-performing Assets An asset, including a leased asset, becomes non performing when it ceases to generate income for the bank.

- A non performing asset (NPA) is a loan or an advance where: interest and/ or installment of principal remains overdue for a period of more than 90 days in respect of a term loan, the account remains 'out of order', in respect of associate Overdraft/Cash Credit the bill remains delinquent for a amount of over ninety days within the case of bills purchased and discounted, the installment of principal or interest on that remains delinquent for 2 crop seasons for brief period crops, the installment of principal or interest on that remains delinquent for one crop season for long period crops, the quantity of liquidity facility remains outstanding for over ninety days, in respect of a securitisation dealings undertaken in terms of the banking company of Bharat (Securitisation of normal Assets) Directions, 2021.
- The overdue receivables representing positive mark-to-market price of a spinoff contract, stay unpaid for a amount of ninety days from the required maturity for payment with respect oof derivative transactions, Out of Order Cash credit/Overdraft (CC/OD) account is classified as NPA if it is 'out of order'.
- Associate account shall be treated as 'out of order' if: the outstanding balance within the CC/OD account remains ceaselessly in more than the sanctioned limit/drawing power for ninety days, or the outstanding balance within the CC/OD account is a smaller amount than the sanctioned limit/drawing power however there aren't any credits ceaselessly for ninety days, or the outstanding balance within the CC/OD account is a smaller amount than the sanctioned limit/drawing power however credits aren't enough to hide the interest debited throughout the previous ninety days amount.
- Asset Classification Banks are required to classify non performing assets further into the following three categories based on the period for which the asset has remained non performing and the realisability of the dues:

Substandard Assets-remained NPA for a period less than or equal to 12 months.

- Doubtful Assets-an quality would be classified as uncertain if it's remained within the substandard class for a amount of twelve months.
- Loss Assets-A loss quality is one wherever loss has been known by the bank or internal or external auditors or the run batted in examination however the quantity has not been written off totally.
- In alternative words, such associate quality is taken into account invalid and of such very little price that its continuance as a bankable quality isn't bonded though there is also some salvage or recovery value.
- **Income Recognition:** Internationally income from NPA is not recognized as income on an accrual basis but is booked as income only when it is actually received.
- The banks should not charge and take income account interest on any NPA.
- This will apply to Government guaranteed accounts also. However, interest on advances against Term Deposits, National Savings Certificates (NSCs), Indira Vikas Patras (IVPs), Kisan Vikas Patras (KVPs) and Life policies may be taken to income account on the due date, provided adequate margin is on the market within the accounts.
- Fees associated commissions attained by the banks as a results of renegotiations or rescheduling of outstanding debts ought to be recognised on an method of accounting over the amount of time covered by the renegotiated or rescheduled extension of credit.
- If any advance becomes NPA, the entire interest accrued and credited to the income account in the past periods, should be reversed if the same is not realized.
- This will apply to Government guaranteed accounts also.

- Provisioning Banks/Financial Institutions are required to set aside a portion of their income as provision for the loan assets so as to be prepared for any contingent losses that may arise within the event of non-recovery of loans.
- The amount of provision to be kept by the bank/FI, will depend on the probability of loan recovery. This likelihood of loan recovery is known supported the quality classification of the loan asset.
- The minimum provision that a bank has to create for various types of assets is as follows:

Asset classification	Minimum provision
Standard assets	
SME & Agri	0.25%
Commercial Residential	0.75%
Commercial	1%
Others	0.40%
Sub-standard assets	15% (25% for unsecured portion)
Doubtful Assets	
Secured	
Up to 1Y	25%
1-3Y	40%
>3Y	100%
Unsecured	100%
Loss asset	100%

Topic 46. ANNUAL SURVEY OF INDUSTRIES

Importance for Prelims:Economy



ASI losing relevance

Annual Survey of Industries (ASI) is conducted by National statistical office (NSO).

- ASI is principal source of the industrial statistics in India.
- ASI, an annual event, not only facilitates suitable information collection based on appropriate sampling techniques however also ensures timely dissemination of statistical data to assess and evaluate the dynamics in composition, growth and the structure of organized manufacturing sector.
- The structure and the function of the industrial sector is an important perspective of Indian Economy.
- It's imperative for industries to grow both qualitatively and quantitatively to boost the economy.
- The well-being of the industries depends truly on the formulation and the promotion of industrial policies framed by the policy makers.

- To frame suitable industrial policies the policy makers need to be aware about the quantified aspect of the existing scenarios in the industries in the country.
- This is where the Annual Survey of Industries (ASI) is conducted by National Statistical Office, Ministry of Statistics & Programme Implementation, Government of India.

Topic 47. GHOST OF ASBESTOS MINING THAT HAUNTS

JHARKHAND

Importance for Prelims: Geography

Many elderly people in Roro village of Jharkhand have breathing disorders and other lung-related ailments. It was alleged that these are the after-effects of asbestos mining, which was stopped in the region almost four decades ago.

- Roro village (mostly inhabited by the Ho Tribal community) is at the foothills of a mountain in the West Singhbhum district of Jharkhand.
- Majority of the villagers are dependent on the minor forest produce for their livelihood.
- Asbestos mining in the region stopped in 1983 – nearly four decades ago.
- Then, in 1986, the Indian government banned giving new mining leases for asbestos mining and in 1993 it stopped the renewal of existing mining leases.
- The ban on asbestos mining was done in phases between 1986 to 1993.
- Asbestos mining is now banned in India but experts note that authorities failed to ensure scientific reclamation of the mines, leaving the local communities exposed to it.
- Unaware of the health hazards, several generations of Roro's residents have been exposed to the asbestos waste lying near the village.
- Many struggle to breathe and there are also cases of eye disorders and cancer in the village.
- **Asbestos and Human Health:** Asbestos is a silicate compound found naturally in the environment and the mining operations used to extract it from the hills which had a rich source of this compound.
- Asbestos fibres are cancer-causing (carcinogenic).

- According to medical studies, once inhaled, the asbestos fibres remain on lung tissues for a longer period leading to scarring and inflammation which ultimately leads to difficulty in breathing.
- According to WHO, “All types of asbestos cause lung cancer, mesothelioma, cancer of the larynx and ovary, and asbestosis (fibrosis of the lungs) among the exposed workers and communities.
- Asbestosis is a notified disease under The Mines Act, 1952.
- In asbestosis, the disease manifestation can take 20-30 years.
- Exposure to asbestos occurs through inhalation of fibres in air in the working environment, ambient air in the vicinity of point sources such as factories handling asbestos, or indoor air in housing and buildings containing friable (crumbly) asbestos materials.
- WHO claims that around 125 million people around the world are exposed to asbestos in their workplace.
- Status of Asbestosis’ use in India: Many countries have banned its extraction and usage.
- However, India still imports the compound and uses it in the automobile sector, talcum powder, construction and other sectors.
- According to government data, in 2019-20, India imported 361,164 tonnes of asbestos.
- The main imports were through Russia (85 percent), Brazil, Kazakhstan and Hungary (three percent each), besides imports from Poland and South Africa.
- India is also said to be the largest importer of asbestos in the world. However, the government records claim that the imports have declined in the past few years.

- **Legal Battle:** In 1988, under the Mineral Conservation and Development Rules, 1988, GOI talked about restoring and reclaiming the mined areas for sustainable development.
- Despite the laws being there, several miners continue to flout the reclamation and restoration laws.
- The Supreme Court of India in a landmark judgement in 1995 had asked the asbestos industries to pay compensation for the health hazards to their workers besides ordering asbestos industries to keep health records of their employees for 40 years since their recruitment and up to 15 years after they leave the company besides their accurate diagnosis.
- In 2019, the National Green Tribunal (NGT) asked the Jharkhand government to ensure scientific removal of the dumped asbestos from the Roro Village.
- The state government vowed to use the District Mineral Foundation (DMF) funds and other resources to mitigate the effects of exposure to asbestos to the village.
- But, in 2022, the dumped waste continues to lie in the open, and the local tribal community is exposed to it.