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Success is born of action...

Topic 1. EV FIRES

Importance for Prelims: Science and Tech

Insurance company	Total number of vehicle fire incidents	Number of EV fire incidents (percentage of total)
A (2006-2016)	567	27 (4.8%)
B (2014-2016)	499	13 (2.4%)
C (2016)	386	9 (2.3%)

The Union government has constituted an expert panel to probe the recent series of battery explosions in electrical vehicles (EVs).

- Manufacturers such as Okinawa and Pure EV have recalled some batches of electric scooters after their vehicles caught fire.

What goes into a Li-ion battery?

- **lithium-ion battery cell consists of the following:** Cathode: the positive terminal of the battery – generally graphite Separator: a thin permeable polymer or similar that separates the cathode and anode Electrolyte: generally a salt of lithium in an inorganic solvent.
- Battery manufacturing could be a complicated operation involving forming sheets of the anode and cathode and assembling them into a sandwich structure held apart by a thin separator.
- Separators, regarding fifteen microns in thickness — about a fifth of the thickness of the human hair — perform the critical function of preventing the anode and cathode from shorting.
- Accidental shorting of the electrodes is a known cause of fires in Li-ion cells.

What causes battery fires?

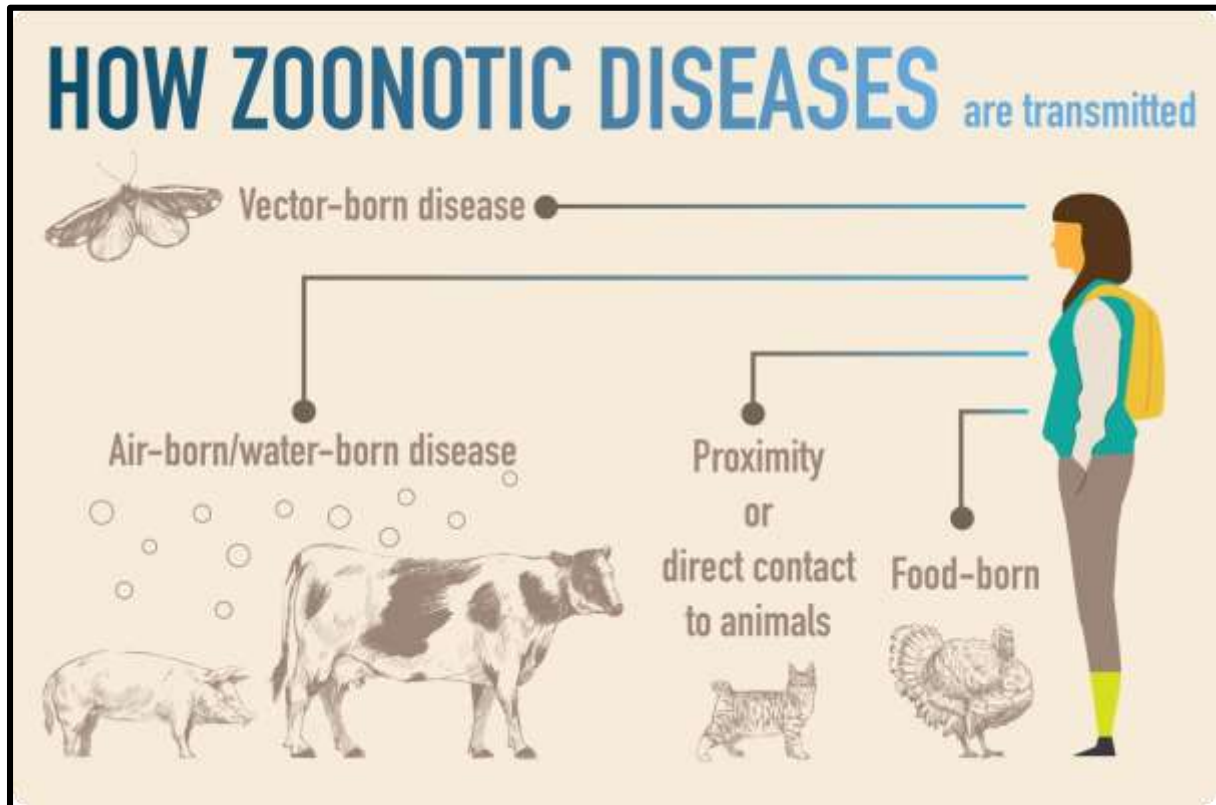
- Li-ion batteries are complex.
- The energy density of petrol is five hundred times that of a typical Li-ion battery, However, batteries do store energy in a small package and if the

energy is released in an uncontrolled fashion, the thermal event can be significant.

- Battery fires, like other fires, occur due to the convergence of three parts of the “fire triangle”: heat, oxygen, and fuel.
- If a short circuit occurs in the battery, the inner temperature will raise because the anode and cathode release their energy through the short.
- This, in turn, can lead to a series of reactions from the battery materials. Such events also rupture the sealed battery further exposing the components to outside air and the second part of the fire triangle, namely, oxygen.
- The final component of the triangle is the liquid electrolyte, which is flammable and serves as a fuel.
- The combination leads to a catastrophic failure of the battery resulting in smoke, heat, and fire, released instantaneously and explosively.
- The trigger for such events may be a results of internal shorts (like a manufacturing defect that results in sharp objects penetrating the separator), external events (an accident resulting in puncture of the cell and shorting of the electrodes), overcharging the battery which leads to heat releasing reactions on the cathode (by a faulty battery management system that does not shut down charging despite the battery achieving its designed charge state), or bad thermal design at the module and pack level (by not allowing the battery internal heat to be released).
- Preventing fires requires breaking the fire triangle. Battery cathodes are a leading reason for the heat release.
- Some cathodes, such as ones with lower nickel content or moving to iron phosphate, will increase safety.

Topic 2. ZONOTIC DISEASES

Importance for Prelims: Science & Tech



Coronavirus can spawn potential variants that can jump back to humans.

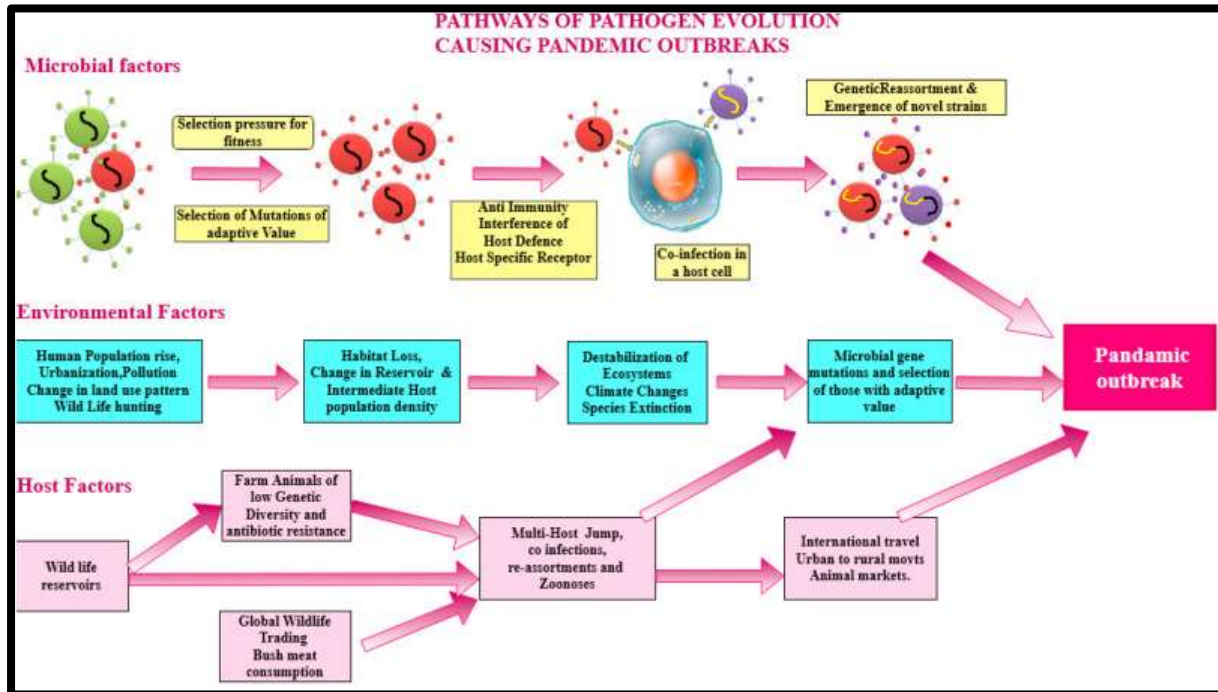
- The role of “animal reservoirs” in the spread of COVID-19 is still being studied however evidence of zoonosis, or the virus jumping from animals to humans, is growing.
- Some experts supported the theory that the highly mutated Omicron variant emerged from animals, potentially rodents, rather than an immune-compromised human.
- As the virus multiplies in infected hosts, it can mutate slightly, and over time, minor genomic tweaks in animals, could eventually add up to changes that make the virus more contagious or deadlier in people, or able to evade treatments and vaccines.
- Flagging the concern, the world Health Organization (WHO) last month aforesaid the introduction of COVID to wildlife may lead to the establishment of animal reservoirs of the virus.

What are Zoonotic Diseases?

- Zoonosis refers to the transmission of diseases between animals and humans. Such diseases are termed Zoonotic Diseases.
- Zoonotic diseases range from mild to severe, while in extreme cases can even be fatal.
- Zoonoses may be bacterial, viral, or parasitic, or may even involve unconventional agents for the transmission of the disease.
- WHO in 1959 defined Zoonoses as “those diseases and infections which are naturally transmitted between vertebrate animals and man.”
- World Zoonoses Day is observed every year on July 6 to create awareness on zoonotic diseases, how to prevent them, and what actions to take when exposed.
- COVID -19 is an example of a zoonotic disease which broke out in China’s Wuhan district in December 2019.

Topic 3. CLIMATE CHANGE MAY INCREASE RISK OF NEW INFECTIONS

Importance for Prelims: Environment



African, Asian nations face the greatest threat of raised virus exposure from animals to humans.

- Global climate change will result in thousands of new viruses spread among animal species by 2070.
- It is likely to increase the risk of emerging infectious diseases jumping from animals to humans, according to a new study.
- This can be very true for Africa and Asia, continents that have been hotspots for deadly disease spread from humans to animals or vice versa over the last several decades, including the flu, HIV, ebola and COVID-19.
- Researchers found that if the world warms by 2 degree celsius, cross-species virus spread will happen over 4,000 times among mammals alone.
- Not all viruses will spread to humans or become pandemic like the scale of the coronavirus however the number of cross- species viruses will increase the risk of spread to humans.

- The study highlights two global crises, climate change and infectious disease spread.
- Previous research has looked at how deforestation, extinction and wildlife trade lead to animal-human disease spread, but there is less research about how climate change could influence this type of disease transmission.
- Climate change can lead to Rise of Zoonotic diseases from animals to humans.

Topic 4. EAST KOLKATA WETLANDS (EKW)

Importance for Prelims: Environment



A recent audit report of the comptroller and Auditor General (CAG) has pointed out illegal construction and violations of environmental norms in 2 Ramsar sites in West Bengal, the East Kolkata Wetlands (EKW) and the Sunderbans.

- The CAG report pointed out that failure to delineate boundaries of the EKW and uncontrolled transfer of land resulted in its change of character and lack of effective action by the EKWMA (East Kolkata Wetland Management Authority).

- In absence of effective measures by EKWMA, waterbodies were dried up and filled illegally.
- Since 2007, EKWMA has identified 357 cases of violation, out of which 101 cases were identified between December 2015 and March 2020, the audit aforesaid.
- **About East Kolkata Wetlands:** The East Calcutta Wetlands are a complex of natural and human-made wetlands lying east of the city of Calcutta (Kolkata), of West Bengal in India.
- The EKW, a unique peri-urban ecosystem that lies on the eastern fringes of Kolkata, covers an area of regarding 12,500 hectares.
- It is spread over 37 mouzas of the State's South and North 24 Parganas districts.
- The wetlands cover 125 square kilometres and include salt marshes, and agricultural fields, sewage farms and settling ponds.
- The wetlands are also used to treat Kolkata's sewage, and the nutrients contained in the wastewater sustain fish farms and agriculture.
- The wetlands have been historically created by a natural shift of the Bidyadhari, a tributary of the Ganga.
- The East Kolkata wetlands is that the biggest ecological asset of the town and a Ramsar site.
- A Ramsar Site is a wetland (shallow waters) which is designated to be of international importance under the Convention on Wetlands, an intergovernmental environmental treaty established in 1971 by UNESCO.
- It came into force in 1975 and takes its name from Ramsar, the Iranian city where the convention was adopted.

Topic 5. UNEMPLOYMENT

Importance for Prelims: Economy

In April, unemployment was highest in Haryana, followed by Rajasthan and Bihar, CMIE information showed.

- Details In the month of April, unemployment was highest in Haryana, followed by Rajasthan and Bihar at 34.5%, 28.8% and 21.1% respectively.
- Himachal Pradesh, Chhattisgarh, and Assam saw the lowest unemployment rate which stood at a miniscule 0.2 per cent, 0.6 per cent and 1.2 percent respectively.
- India's labour force fell by thirty eight lakhs in the month of March, lowest level in the last eight months, possibly too disappointed with their failure to get a job and under the belief that there have been no jobs available.
- The working age population had dropped out of the labour force as a large proportion was pursuing education or engaged in unpaid activities such as care giving according to the government and not due to 'lost hope'.

Topic 6. RETAIL PRIME LENDING RATE

Importance for Prelims: Economy

Why in the news?

HDFC will increase its Retail Prime lending Rate (RPLR) on Housing loans, on which its adjustable rate home loans (ARHL) are benchmarked, by five basis points, with effect from May 1, 2022

- In India, the PLR is the rate on which commercial banks lend to their most trustworthy and creditworthy customers.
- RBI does not decide the PLR of NBFCs or Housing finance institutions.
- RBI only announces the Repo rate which affects the cost of raising new funds for housing finance companies.
- Effective 1st April 2016, banks have been directed by the RBI to fix their loan interest rates benchmark to MCLR rate.
- However, HFC and NBFCs continue to offer loans at PLR rates.
- Presently, all commercial banks have the authority to set their own benchmark prime lending rate (BPLR) with the sanction of their respective boards.
- The prime lending rate is crucial for borrowers, as the PLR directly affects the lending rates for a home loan.
- The prime lending rate is that the primary determiner of most of the interest rates charged by the lending institution; it's a component of the rate charged to the customer.
- **INTEREST RATES = SPREAD + PRIME LENDING RATE** The spread component is it either positive or negative and remains constant throughout the tenure of the loan.
- Any change in PLR affects the Floating Rate of Interest only.
- In India, the most loans have a fixed rate of interest, except home loans.
- So changes in PLR don't affect the majority of loans; however, home loans with floating interest rates are dependent on the PLR.

- **BPLR vs Base rate vs MCLR:** Benchmark Prime Lending Rate or BPLR was introduced by the Reserve Bank in 2003.
- It's the rate applied by a bank to its most creditworthy customers. However, the most important problem with BPLR was lack of transparency.
- Banks could lend below the BPLR to privileged customers.
- All commercial banks have the authority to set their own benchmark prime lending rate (BPLR) with the sanction of their respective boards.
- So, in 2010, the Reserve Bank of India introduced the base rate system, which replaced the BPLR system.
- Currently, the housing finance companies lend at retail prime lending rate, which is similar to BPLR.

Base rate system?

- Banks were not permitted to resort to any lending below this benchmark. Banks were required to review the Base Rate at least once in a quarter. Base Rate is linked to: Cost of fund, Unallocated cost of resources, Return on net worth. MCLR system: Banks were allowed to determine their actual lending rates on loans and advances with reference to the Base Rate and by including such other customer-specific charges as considered appropriate.
- Now, whenever RBI changes the Repo Rate under the base rate, the changes in interest rate aren't automatically transferred to borrowers.
- Therefore, in April 2016, the RBI introduced MCLR to tackle problems related to the Base rate regime. Banks stopped lending on the base rate from the April 2016.
- But, loans taken between June 2010 and April 2016 from banks remained on the base rate mechanism.

What is MCLR?

- Minimum interest rate below which financial institutions can't lend It is a benchmark lending rate for floating-rate loans
- The main aspects while calculating MCLR: Marginal cost of funds
Operating costs Cost of Carry in the Cash Reserve Ratio (CRR) Tenor premium
- The MCLR is determined by the current cost of funds, in contrast to the base rate, that is governed by the average cost of funds.
- It also provides transparency in the procedure followed by banks to arrive at interest rates on advances.
- MCLR is considered better in all respects as a result of rates based on this system are more receptive to the changes in the policy rate.
- Any change in the Repo Rate it is reflected almost immediately.
- This also ensures that the country's financial policy is implemented effectively across all spheres.
- Now, if you are planning to take a loan from a bank on a floating rate to buy a house, it will be linked to MCLR.
- And remember, you always have the option to convert your loans from base rate to MCLR.

Topic 7. JUTE TEXTILE ISSUE

Importance for Prelims: Economy

The Office of the Jute Commissioner (JCO)'s September 30 notification mandated that no entity would be allowed to purchase or sell raw jute at a price exceeding ₹6,500 per quintal.

In simple words, mills are procuring raw jute at prices higher than what they are selling them after processing.

The government has a fixed Minimum Support price (MSP) for raw jute procurement from farmers, that is ₹4,750 per quintal for the 2022-23 season. However, this reached his mill at ₹7,200 per quintal, that is, ₹700 more than the ₹6,500 per quintal cap for the final product. This high gap between MSP and procurement cost of the mills is due to the fact that they procure raw jute from intermediaries instead of farmers themselves, who charge a high commission.

- As per the Food and Agriculture Organisation (FAO), India is that the largest producer of jute followed by Bangladesh and China.
- West Bengal, Bihar and Assam account for almost 99% of India's total production.
- In terms of acreage and trade, Bangladesh takes the lead accounting for three-fourth of the world jute exports in comparison to India's 7 percent.
- This can be attributed to the fact that India lags behind Bangladesh in producing superior quality jute fibre due to: Infrastructural constraints related to retting, Lack of farm mechanisation, Lack of availability of certified seeds and varieties suitable for the country's agroclimate.
- Jute acreage competes with crops such as paddy, maize, groundnut, and sesame.
- The increased availability of synthetic substitutes is further bothering the demand for jute domestically.
- Lack of export competitiveness-as Bangladesh provides cash subsidies

for varied semi-finished and finished jute products.

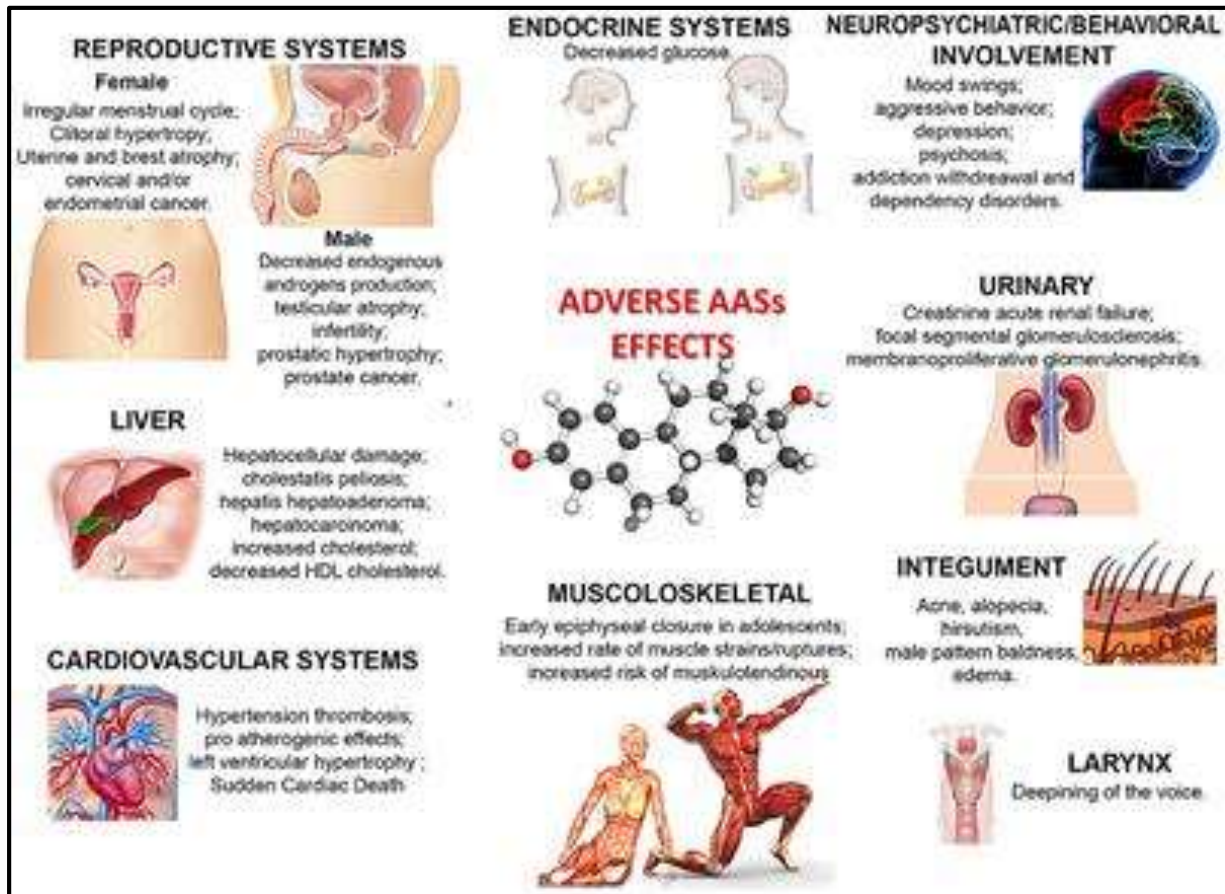
- **Laws:** Government has expanded the scope of mandatory packaging norms under the Jute Packaging Materials (Compulsory Use in Packing Commodities) Act, 1987, also known as the JPM Act.
- Under it, the Government is required to consider and provide for the compulsory use of jute packaging material in the supply and distribution of certain commodities.
- It mandates that 100% production of foodgrains and 20% sugar production must be packaged in jute bags.
- **Shemes:** Jute-Improved Cultivation and Advanced Retting Exercise: Jute ICARE aims to improve the productivity and quality of raw jute.
- Under it, the govt. is disseminating improved agronomic practices like line sowing using seed drills, distribution of quality certified seeds, etc.
- **Jute SMART:** It is an e-govt initiative that was the launched in Dec 2016 to promote transparency in the jute sector.
- It provides an integrated platform for the procurement of sacking by Government agencies.
- **Definitive Anti-Dumping Duty:** It has been imposed on import of jute goods from Bangladesh and Nepal with effect from 5th January 2017 to protect the domestic sector.
- **Incentive Scheme for Acquisition of Plants and Machinery:** Launched in 2013, it aims to facilitate modernisation in existing and new jute mills and up- gradation of technology in existing jute mills.
- Collaboration between the National Jute Board and the National Institute of Design: It aims to support the diversification of the jute sector through a Jute Design Cell.
- National Jute Board under the Ministry of Textiles, acts as the apex body for the promotion of the products in India and abroad. Jute is included in

the Minimum Support Price (MSP) regime of the country.

- The Jute Commissioner looks after orderly development and promotion of the jute industry in India.
- He has been discharging both the regulatory and developmental functions.
- This not only includes jute mills, but covers right from raw jute marketing up to the finishing stage of jute goods production including development of machineries and accessories used in jute manufacturing units.
- The Jute Commissioner exercises regulatory powers under Jute & Jute Textiles Control Order, 2016.
- Administering of mandatory packaging under the JPM Act, declaration of MSP of jute, declaration of monthly price of B-Twill sacking, informal monitoring of R&D Projects. Regulator for the Jute Sector.
- Functions: Monitoring and implementation of JPM (Compulsory use in Packing Commodities) Act, 1987 and Jute & Jute Textiles Control Order 2016.
- Furnishing technical advice to the Ministry on all policy matters related to the jute sector.
- Monitoring MSP prices for other grades of raw jute (based on CACP notification for TD-5 variety).
- Monthly fixation of Govt B-Twill prices it is based upon updated provisional price methodology duly approved by Ministry of Textiles.
- Coordination between all Govt. / Semi-Govt. and Autonomous bodies in the Jute Sector.
- Handling the functions taken over by DGS&D since November 2016 for purchase of B.T will Jute bags by the State procurement Agencies (SPAs) to the tune of Rs.6,000 Crores.

Topic 8. ANABOLIC STEROIDS

Importance for Prelims: Science and Technology



Anabolic steroids are the essentially lab-made versions of the male hormone testosterone. They have a similar effect of increasing muscle mass as the natural hormone. It also increases male characteristics in a person, such as facial hair and a deeper voice.

- However, anabolic steroids are very different from the steroids that are prescribed by doctors for inflammations, several autoimmune diseases, or to suppress the body's immune system during a Covid-19 infection.
- These medicines are called corticosteroids and are lab-made molecules that mimic the action of the hormone called cortisol that controls the body's stress response, metabolism, and inflammation. Unlike the corticosteroids, anabolic steroids have limited medical use.

- “Anabolic steroids are the mainly misused by athletes and sportspersons these days.

How are anabolic steroids misused?

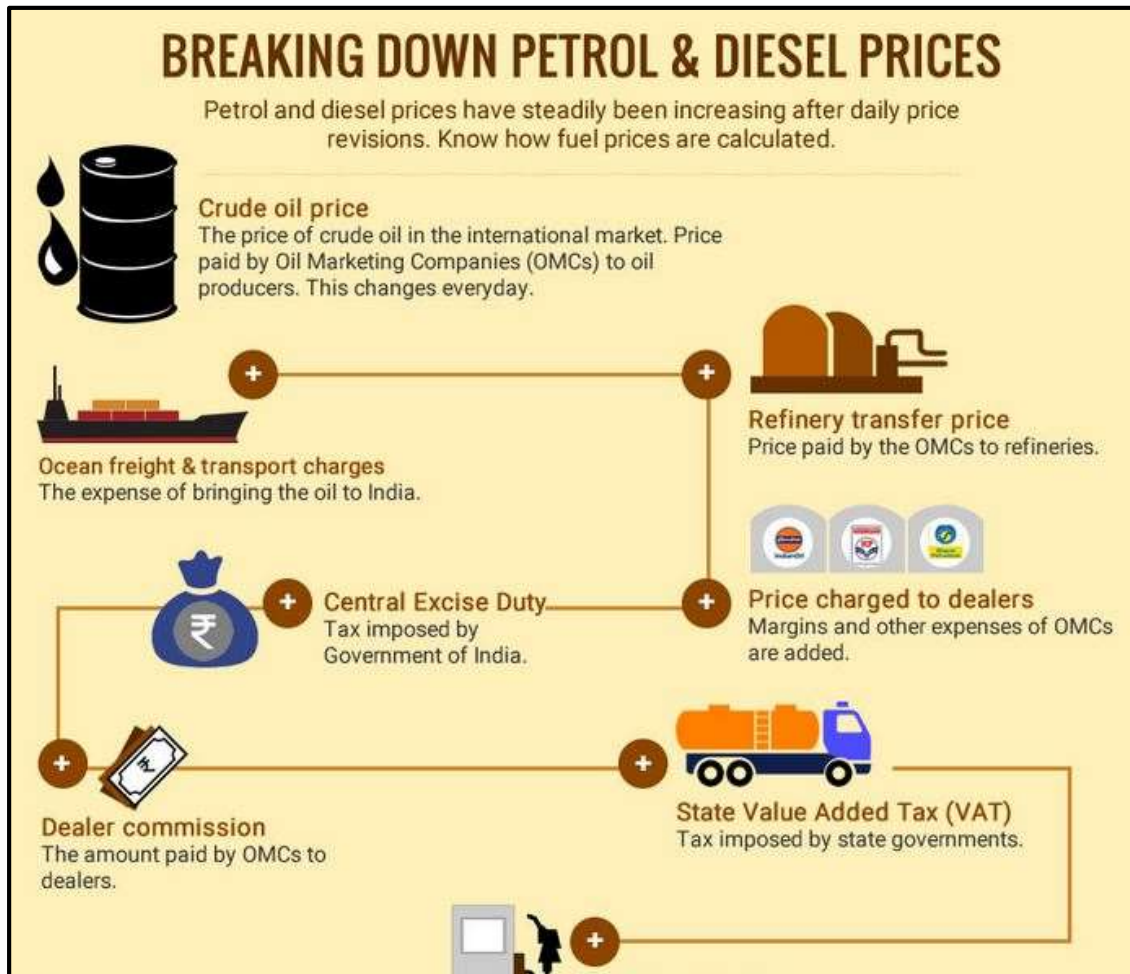
- Misused mainly by people who want to bulk up because it helps increase one’s muscle mass.
- Although no concrete estimate exists of the number of people using the drug across India, a 2018 study from Jammu and Kashmir found that 7.1 per cent of athletes used it.

What are the health impacts of anabolic steroids ?

- Use of anabolic steroids in the short-term can cause acne and hairfall. Extended misuse of the substance can even lead to gynaecomastia (growth of breasts in men) and erectile dysfunction.
- In women, it can lead to growth of facial hair.
- It may also cause extreme anger, paranoia, and impaired judgement.
- Long-term use can lead to kidney disease and even failure, liver damage and tumours, enlarged heart, and high blood pressure.
- It can also lead to stunted growth in teenagers.

Topic 9. PRICING REGIME OF FUEL

Importance for Prelims: Economy



It is quite complicated that the final retail value of petrol and diesel has multiple components. **Components of Fuel prices:**

- The base price, including the freight, accounts for 56 per cent of the final selling price for petrol and 60 per cent for diesel.
- The Centre charges excise duty on the base price accounting for 26 per cent and 23 percent of the final price of petrol and diesel, respectively.
- The dealer's commission amounts to another 4 and 3 percent of the selling price of the two petroleum products.
- The States levy value-added tax (VAT) on the cost of petrol and diesel, including excise duty and dealer's commission.

- **Taxing policy:** As of now LPG, kerosene, naphtha, furnace oil, and light diesel oil are under GST.
- Five other petroleum products viz. crude oil, high speed diesel, motor spirit (petrol), natural gas, and aviation turbine fuel lie outside the GST.
- **Centre Taxation:** At present, Centre levies the excise duty on crude oil which is a specific tax i.e. charged on the number of the units sold irrespective of the prices.
- The excise duty charged by the Centre, comprises of four elements — Basic excise duty, Special excise duty, Additional excise duty (road and infrastructure cess) and Agriculture and infrastructure development cess.
- The Centre has to share only the amount collected under the basic excise duty with the States as other components are either cesses or bucketed under surcharge.
- The basic excise duty accounts for just 4.2 per cent of the amount collected by the Centre as fuel taxes.
- Once forty one per cent of the basic excise duty is shared with the States, the Centre retains over ninety eight per cent of the tax collected on petrol and diesel.

Why are States against Centre levying cess on fuel?

- Cess is a tax charged over the basic liabilities, and it's levied for a particular purpose, like education cess, infrastructure development cess, etc.
- More necessary, since the cess collected should be spent only for a specific purpose, the Centre needn't share the collection with States.
- **State Taxation** The States levy value-added tax (VAT) on the cost of petrol and diesel, including excise duty and dealer's commission petrol.
- Since VAT is an ad-valorem tax, it will go up and down with the market price of the fuel. States have been given a freedom in structuring and taxing fuel.

- Many States/UTs such as Arunachal Pradesh, Delhi, Odisha and Telangana charge just VAT at a certain rate applied to the cost of the petrol.
- Others choose a hybrid model wherein they charge a lower VAT on the fuel and apply a flat charge per litre of petrol and diesel.
- States like-Tamil Nadu, Maharashtra, Andhra Pradesh and others have this hybrid model.
- The other the States and UTs apply other innovative charges, including road development cess, employment cess, pollution surcharge etc.

Topic 10. THE DEBATE ON THE NATIONAL LANGUAGE

Importance for Prelims: Polity

Remarks by a Hindi actor to the effect that Hindi is the national language of India sparked a controversy recently over the status of the language under the Constitution.

What is the status of Hindi?

- Under Article 343 of the Constitution, the official language of the Union shall be Hindi in the Devanagari script.
- The international form of Indian numerals will be used for official purposes.
- The Constituent Assembly was bitterly divided on the question, with members from States that did not speak Hindi at first opposing the declaration of Hindi as a national language.
- Proponents of Hindi were insistent that English was the language of enslavement and that it should be eliminated as early as possible.
- Opponents were against English being done away with, fearing that it may lead to Hindi domination in regions that did not speak the language.
- There were demands to make Sanskrit the official language, while some argued in favour of 'Hindustani'.
- There were differences of opinion over the script too.
- When opinion veered towards accepting Hindi, proponents of the language wanted the 'Devanagari' script to be adopted both for words and numerals.
- Some advocated that the Roman script be adopted, as it would facilitate faster learning of Hindi.
- The predominant opinion was in favour of adopting 'international numerals' instead of Hindi numerals.
- Ultimately, it had been decided that the Constitution can only speak of an

‘official language’.

- And that English would continue to be used for a period of 15 years.
- The Constitution said that after fifteen years, Parliament could by law decide on the use of English and therefore the use of the Devanagari script kind of numbers for specified purposes.

What is the Eighth Schedule?

- The Eighth Schedule contains a list of languages in the country. Initially, there have been fourteen languages in the schedule, however currently there are twenty two languages.
- There is no description of the sort of languages that are included or will be included in the Eighth Schedule.
- There are only two references to these languages in the text of the Constitution.
- One is in Article 344(1), that provides for the formation of a Commission by the President, that should have a chairman and members representing these scheduled languages.
- The purpose of the Commission is to make recommendations for the progressive use of Hindi for official purposes of the Union and for restricting the use of English.
- The second reference, found in Article 351, says it's the Union government's duty to promote the spread of Hindi so that it becomes “a medium of expression for all elements of the composite culture of India” and also to assimilate elements of the forms and expressions from Hindustani and the languages listed in the Eighth Schedule.
- **Background of 1965 protests:** The Official Languages Act, 1963 was passed in anticipation of the expiry of the 15-year period throughout that the Constitution originally allowed the use of English for official purposes.
- Its operative section provided for the continuing use of English,

notwithstanding the expiry of the 15-year period.

- This came into force from Jan 26, 1965, a date which marked the completion of 15 years since the Constitution was adopted.
- Jawaharlal Nehru had given an assurance in 1959 that English would remain in official use and as the language of communication between the Centre and the States.
- The Official Languages Act, 1963, didn't explicitly incorporate this assurance, causing apprehensions in some States because the January 1965 deadline neared.
- At that time, Prime Minister Lal Bahadur Shastri reiterated the government's commitment to move towards making Hindi the official language for all purposes.
- In Tamil Nadu the prospect of the use of Hindi as the medium of examination for recruitment to the Union public services created an apprehension that Hindi would be imposed in such a way that the future employment prospects of these who don't speak Hindi are going to be bleak.
- With the Congress government in the State taking the view that the people had nothing to be fear about, protests broke out in January 1965.
- It took a violent turn when more and more student activists joined the protest, and continued even when key Dravida Munnetra Kazhagam (DMK) leaders were arrested.
- More than sixty people died in police firing and other incidents because the protests went on for days.
- The agitation died down later, but by then the Congress at the Centre realized the sensitivity of the language issue among Tamil-speaking people.
- When the Official Language Rules were framed in 1976, it was made

clear that the Rules apply to the whole of India, except Tamil Nadu.

Topic 11. FEDERALISM AND QUASI FEDERALISM

Importance for Prelims: Polity

Federalism is a system of government in which the power is divided between a central authority and various constituent units of the country.

- This vertical division of the power among different levels of governments is referred to as federalism.
- Quasi-federalism means an intermediate form of state between a unitary state and a federation. It combines the features of a federal government and the features of a unitary government.
- India consciously adopted a version of federalism that made the Union government and State governments interdependent on each other (latter additional vis-a-vis the former) thereby violating the primal characteristic of a federal constitution i.e., the autonomous spheres of the authority for Union and State governments.
- Federal Features of the Indian Constitution Unitary Features of the Indian Constitution
 1. **Supremacy of the Constitution:** Constitution is the supreme law of land in India. A federal state derives its existence from the Constitution. 1. **Single Constitution:** In India, there is only one Constitution. It is applicable to both the Union as a whole and therefore the States.
 2. **Bicameral Legislature:** The Constitution of India also provides for a bicameral legislature i.e. Parliament with two houses of the Lok Sabha and the Rajya Sabha.

Rajya Sabha does not represent the States equality:

- Rajya Sabha, the States do not have equal representation.
- The populous States have more representatives in the Rajya Sabha than the less populous States.
- 3. **Dual Government Polity:** The Constitution of India has divided powers

between the Central government and the state governments through the 7th schedule Both the governments have their separate powers and the responsibilities. **Division of power is not equal:** In India, the Central government has been given more powers and made stronger than the State governments.








4. **Written Constitution:** The Indian Constitution is a written document containing 395 Articles and 12 schedules, and therefore, fulfils this basic requirement of a federal government.
5. **Existence of States depends on the Centre:** In India, the boundary of a State can be changed by created out of the existing States.
6. **Rigid Constitution:** The Indian Constitution it is largely a rigid Constitution. All the provisions of the Constitution regarding Union-State relations may be amended only by the joint actions of the State Legislatures and therefore the Union Parliament.
7. **Constitution is not strictly rigid:** The Constitution of India may be amended by the Indian Parliament easily. On many subjects, the Parliament does not need the approval of the State legislatures to amend the Constitution.
8. **Independent Judiciary:** The Supreme Court of India can declare a law as unconstitutional, if it contravenes any provisions of the Constitution.
9. **Unified judiciary:** India has a unified or integrated judicial system. The High Courts that work in the States are under the Supreme Court of India.
10. **Proclamation of emergency:** When an emergency is declared, the Union or Central governments become all powerful and the State governments come under the total control of it. The State governments lose their autonomy. Reasons for a centralised federal structure There are at following reasons that informed India's choice of a centralised federal structure.

11. **Partition of India and the concomitant concerns:** Union Powers Committee of the Constituent Assembly, in favour of a strong Union with residuary powers and weaker States, to safeguard the integrity of the nation.
12. **To forge a national civic identity:** The centralised structure would unsettle prevalent trends of social dominance, help fight poverty better and therefore yield liberating outcomes.
13. **Building of a welfare state:** In a decentralised federal setup, redistributive policies could be structurally thwarted by organised (small and dominant) groups. Instead, a centralised federal set-up can prevent such issues and further a universal rightsbased system.
14. **Alleviation of inter-regional economic inequality:** Provincial interventions seemed to exacerbate inequalities India's membership in the International Labour Organization, the Jawaharlal Nehru Report (1928), and also the bombay plan (1944) pushed for a centralised system to foster socio-economic rights and safeguards for the working and entrepreneurial classes.
15. **Linguistic reorganization:** It would not have been possible if India followed a rigid or conventional federal system. . In different words, the current form of federalism within the Indian context is largely a function of the intent of the govt of the day and also the objectives seeks to achieve.

Topic 12. WHY FLIGHTS FACE TURBULENCE?

Importance for Prelims: Geography

Seven kinds of turbulence

 <p>WIND SHEAR: Happens when there is a sudden change in wind direction, whether vertically or horizontally. Typically occurs close to thunderstorms, jet streams, etc.; tricky for pilots as tailwinds suddenly change to headwinds or vice versa.</p>	 <p>FRONTAL: Created in frontal zone when warm air is lifted by sloping frontal surface and friction between opposing air masses. Most palpable when warm air is moist; intensity increases with thunderstorms. Most common close to thunderstorms.</p>	 <p>CONVECTIVE: When land surface temperature rises, the air above the ground heats up and rises, creating air pockets around it. Convection currents cause difficulties during approach as they tend to affect the rate of descent.</p>
 <p>WAKE: Forms behind an aircraft when it flies through air-creating wingtip vortices. Can be dangerous for small aircraft following bigger ones, which tend to disrupt the airflow more strongly in their wake.</p>	 <p>MECHANICAL: This type of turbulence occurs when tall solid objects such as mountains or highrise constructions disrupt the normal airflow, causing the air for planes to fly through to become dirty.</p>	 <p>CLEAR AIR: Occurs when an aircraft crosses from one air mass to another, which has a different direction. Clear air turbulence could also happen when an aircraft moves out of a jet stream.</p>
 <p>MOUNTAIN WAVE: One of the most severe; these are oscillations that form on the downwind side of mountains when strong winds flow towards mountains in a perpendicular fashion. Aircraft tracking perpendicularly across, or downwind of a mountain, may experience sudden loss of altitude followed by a sudden reduction in airspeed.</p>		

Directorate General of Civil Aviation (DGCA) on Monday constituted a “multidisciplinary team” to investigate the incident that caused serious injuries to several passengers after SpiceJet’s Mumbai- Durgapur flight encountered severe turbulence.

- There are at least seven kinds of turbulence that an aircraft can run into.
- **These include:** On a regular basis, Aircraft undergo some form of turbulence and pilots are trained to deal with these.
- However, there have been several instances when turbulence has brought down modern jetliners.
- Even in these cases, whereas intense turbulence has been the main reason for an accident, many different factors—such as lack of proper training, poor dissemination of weather or wind related information — have contributed to the accident.
- During descent, if the aircraft experience severe turbulence, the vertical load factor varies from +2.64 G and 1.36 G.
- During this period, the auto pilot gets disengaged for two minutes and the

crew manually fly the aircraft.

- G refers to g gravitational force equivalent, which in normal flying conditions is 1 G.
- A negative G value indicates that the aircraft was accelerating downwards quicker than the rate of natural free fall, giving the feeling of weightlessness.
- Airflow Disruption can be of four varying intensities.

Topic 13. SOPS TO BE FRAMED FOR BLENDING OF IMPORTED COAL

Importance for Prelims: Economy

The Power Ministry has asked the Central Electricity Authority (CEA) to create a standard operating procedure (SOP) for blending of domestic and imported coal used at thermal power plants (TPPs) as the Coal supply at thermal plants is under pressure due to high electricity demand.

- The pressure on domestic supply for the key commodity forced the govt. to increase the percentage of imported coal in the domestic mix to ten per cent from four per cent in December 2021.
- India imports coal from Indonesia, South Africa and Australia.
- The gross calorific value (GCV) of imported coal is in the range of 5700-6300 k Cal per kg while that of domestic coal ranges from 2900-4200 k Cal per kg.
- Generally, Indian power boilers are designed for high ash Indian coal and the furnace is also higher (height) by around 20 per cent compared to boiler for imported low ash coal.
- The average ash content of coal supplied to Gencos is in the range of 35-45 per cent.
- The inferior quality of coal (high ash content), not only pollutes the environment however also leads to high cost for operations & maintenance (O&M) and ash disposal.
- Experts point out that coal characteristics that affect boiler design are ash content, volatile matter, moisture content, fixed carbon, gross calorific value (GCV), hard grove Grindability index (HGI), coal reactivity and ash fusion characteristics.
- TPPs follow numerous methodologies for blending of foreign and domestic coal such as separate layering of both in a stockyard or blending

in beds. Besides, blending on conveyors by silo, blending by ground hoppers or emergency reclaim hoppers and blending of 2 streams of coal on conveyor belt also are used for mixing.

- The blending method followed at NTPC and Damodar valley Corporation (DVC) are analysed to devise a pan-India mechanism.
- NTPC, which can import around twenty million tonnes of coal in FY23, formula suggests that ten per cent blending of imported coal gives fifteen per cent more heat.
- Besides, in terms of heat content, this makes one tonne of coal (blended) worth 1.5 tonnes (of Indian coal).
- **Coal Imports:** Coal imports by the power sector declined from 69.22 mt in FY20 to 45.47 mt in FY21.
- As per Care Edge, throughout April 2021-February 2022, coal import by power sector decreased further to 24.2 mt from 42.4 mt throughout the corresponding period of previous year.
- Coal prices of South African thermal, a global benchmark, have been on an upward trajectory since December 2021 and the on -going tension between Russia Ukraine has impacted the international coal prices even more.
- The global benchmark has crossed its all-time high value at \$199.7 per tonne and has peaked at around \$295 per tonne as of March 2022.
- The continuous rise in coal costs is discouraging coal imports which are pressurising domestic coal producers to extend supply to fulfil the coal demand in the country.

Topic 14. PMO PUSHES STATES/UTS ON COMPLETION OF PENDING MEGA PROJECTS BY 2024

Importance for Prelims: Polity

The Prime Minister's Office has sought details from States and Union Territories on mega projects that can be completed in the next two years. Prime Minister's office [PMO] PMO is a staffing agency assisting the Prime Minister in the efficient discharge of his role, functions, and responsibilities.

Evolution Of PMO:

- The Prime Minister's Secretariat was created in 1947 when India gained independence.
- The Secretariat was created for the immediate purpose of taking over the functions performed until then by the Secretary to the governor general, because the Prime Minister took over almost all functions which the Governor-General prior to independence, performed as the govt head of the govt.
- PMO is an extra-constitutional body that has no mention in the Indian Constitution.
- However, it was given the status of a department under the Government of India Allocation of Business Rules, 1961.
- • Since June 1977, it's called Prime Minister's office and is headed by the Secretary to the Prime Minister who is currently designated as the Principal Secretary to the Prime Minister.
- Why Needed Complexity and scope of government have increased tremendously.
- Therefore it requires a strong and technically efficient staff agency to handle the same.
- The problems of coordination between the Ministers are becoming more complex.

- Since all Ministers are entitled to have an office set-up of their own to enable them to perform their functions.
- PMO is the office of the Prime Minister. Most importantly, the PMO has two irreducible functions.
- Firstly, PMO is the conduit to and from the Prime Minister.
- Secondly, the Prime Minister depends on PMO, i.e. Principal Secretary to the Prime Minister, if he wants a second opinion on any other matter.
- **Structure of PMO:** Politically headed by The Prime Minister Administratively headed by Principal Secretary One or 2 additional secretaries five joint secretaries a number of the directors/ deputy secretaries and under secretaries.
- The personnel are generally drawn from the civil services and also appointed for the varying periods PMO and its Administrative function Well, it acts as a link between the PM and his Ministers, President, Governors, Chief Ministers and also the Foreign representatives.
- And, on the opposite the public, that's the general public side wherever it's concerned with the party matters, personal correspondences, complaints from the public, and many more.
- It helps the PM in the performance of his functions as the head of the government.

Principal functions of the PMO:

1. To deal with all references which under the rules of business have to come to the PM
2. To help the PM in the discharge of his overall responsibilities as the Chief Executive like liaison with the Union Ministries and the State govts on matters which the PM may be interested.
3. To help the PM in the discharge of his responsibilities as the Chairman of Planning Commission.
4. To deal with Public relations side of the PMO.

5. To provide PM assistance in the examination of cases submitted to him for an order under prescribed rules.

Topic 15. CENTRAL COUNCIL OF HEALTH & FAMILY WELFARE

Importance for Prelims: Governance

The Union Health Minister Mansukh Mandaviya can chair the 14th Conference of the Central Council of Health & Family Welfare, as Swasthya Chintan Shivir, at Kevadia, Gujarat on could 5-7.

- The Central Council of Health and Family Welfare was established under Article 263 of the Constitution to provide support and advice to the Department of Health on policy formulation.
- The Ministry of Health and Family Welfare, Government of India in collaboration with the World Health Organization Country office for India has compiled and digitized the proceedings of all Central Council meetings held from the year 1988 upto 2010.

Topic 16. PERSONAL AUTONOMY AND ARTICLE 21

Importance for Prelims: Polity

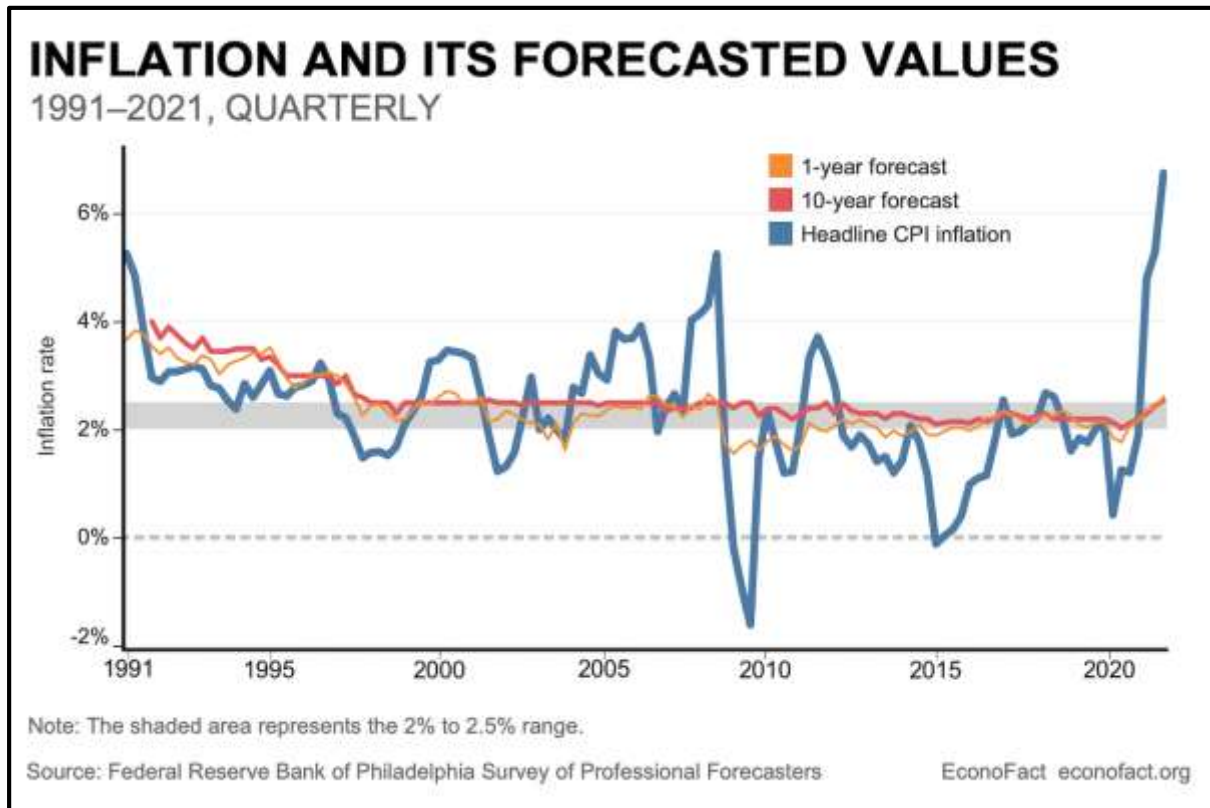
The Supreme Court upheld the right of an individual against forcible vaccination and therefore the government's COVID-19 vaccination policy to protect communitarian health.

- It found certain vaccine mandates imposed by the State governments and Union Territory administrations disproportionate as they tend to deny access to basic welfare measures and freedom of movement to unvaccinated individuals.
- Article twenty one vs Communitarian health' The court struck a balance between individual right to bodily integrity and refusing treatment with the government's concern for public health.
- • "With respect to bodily integrity and the personal autonomy of an individual in the light of vaccines and other the public health measures introduced to deal with the COVID-19 pandemic, court is of the opinion that bodily integrity is protected under Article 21 (right to life) of the Constitution and no individual can be forced to be vaccinated," A person has the the right under Article twenty one to refuse treatment, the court acknowledged.
- • "Personal autonomy of an individual, that may be a recognised facet of protection guaranteed under Article twenty one encompasses the right to refuse to undergo any medical treatment in the sphere of individual health, "Supreme court observed.
- However, once the problem extended to "communitarian health", the govt. was indeed "entitled to regulate issues".
- The government's right to regulate by imposing limits to the individual rights for the sake of protecting public health was also open to judicial scrutiny.

- Courts had the authority to review whether the govt's interventions into the personal autonomy of an individual and right to access means of livelihood met the "three-fold" requirements as expounded in the Constitution Bench judgment in K.S. Puttaswamy case (the judgment that upheld the right of privacy as a constitutional right under Article 21).
- The three-fold needs include whether the legality of the limitations imposed by the govt. on the individual rights presupposes the existence of a law.
- That is, the limitations should be backed by a clear statutory law.
- The need for limitations should be proportionate to a legitimate State aim.
- There should be a rational nexus between the State's objectives for imposing the restrictions and the means adopted to achieve them.

Topic 17. ROLE OF INFLATION-EXPECTATION

Importance for Prelims: Economy



The Reserve Bank of India released the Inflation Expectations Survey of Households (IESH) for March on Friday.

- It presented gender based differences in the inflation expectations i.e. women have systematically higher inflationary expectations compared to men.
- Cause: The traditional gender roles that explain this divergence women, arguably homemakers, traditionally do more frequent grocery shopping than men.
- **Impact of Inflation expectation on Inflation:** Increase Inflation-If individuals anticipate high inflation, they would negotiate wages or rents to compensate against a potential fall in their purchasing power.
- Increased wages raise the price of production, making expectations self-fulfilling and, therefore, playing a pivotal role in determining inflation.

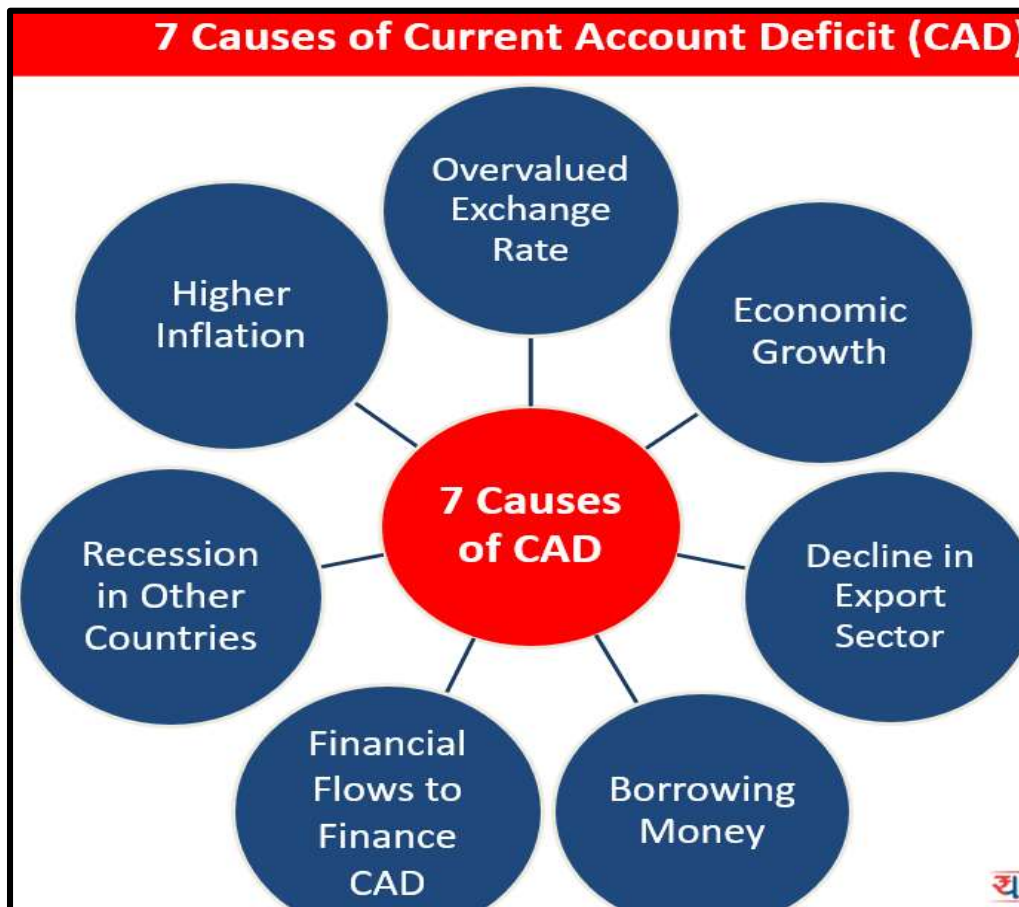
- Harm saving-consumption behaviour-as having ramifications on an individual's long-term wealth.
- Policy Measures Central banks raise interest rates to stabilize high inflationary expectations primarily when price shocks are temporary, on account of drought or disruption in global supply chains,so that inflation expectations don't transmit into actual inflation.
- **Issue:** Change in inflation expectation mainly due to changes in price of daily use items the prices of the lower-priced potatoes, milk, or apples frequently purchased shape the aggregate expectations more than that of infrequent purchase of a high-priced car or the washing machine, even though they constitute a substantial expenditure share of the individual.
- Thus, generalising aggregate inflation expectations for making general views of costs in the economy could be misleading and will cause perverse policy making.
- **Alternative:** Supply management of volatile goods purchased daily could be more effective in anchoring inflationary expectations. Inflation Expectations Survey of Households.
- The survey is conducted at bi-monthly intervals by the Reserve Bank of India.
- It provides directional information on near-term inflationary pressures as expected by the respondents and may 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 costs of specific product groups).

- It measures Households' median inflation perceptions in 3 periods– for the current period, 3 months ahead as well as in the one year ahead period.

Topic 18. RISING CURRENT ACCOUNT DEFICIT

Importance for Prelims: Economy



For the third quarter of 2021-22, India's current account deficit (CAD) has reached \$23 billion, which is a nine-year high.

- **Cause**– Rise in import-India's exports are doing well, but as imports are growing faster, widening of the trade deficit is likely in the near term-owing to global inflation and currency depreciation Capital outflows Foreign portfolio capital flows, which are a large component of foreign investment in India, have turned negative/ net sellers during the last 6 month.
- The imminent interest rate hike in the US is one possible, others being uncertain global growth prospects due to COVID and Ukraine War.
- Private equity/Venture capital (PE/VC) funding slowing down A

combination of these unfavourable economic factors has led to a sharp decline in forex reserves.

- **Indicators of growing external vulnerability:** Capital outflows
Reducing forex and import cover Imported Inflation and related currency depreciation Rising current account deficit Forex composition- it is made up entirely of liabilities, namely the foreign capital inflows.
- This makes India's forex reserves more vulnerable to the threat of a sudden exodus of foreign capital.
- **Foreign Direct Investment:** FDI is that the process whereby residents of 1 country (the home country) acquire ownership of the assets for the purpose of controlling the production, distribution and different activities of a firm in another country (the host country).
- FDI includes capital flows to listed and unlisted companies and private equity/venture capital (PE/VC) funding.
- It's different from Foreign Portfolio Investment wherever the foreign entity merely buys stocks and bonds of a company.
- FPI doesn't give the investor with control over the business.
- Flows of FDI comprise capital provided (either directly or through the other related enterprises) by a foreign direct investor to an enterprise.
- FDI has three components, viz., equity capital, reinvested earnings and intra-company loans.
- Equity capital is that 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 (in proportion to direct equity participation) of earnings not distributed as the dividends by affiliates, or earnings not remitted to the direct investor.
- Such retained profits by affiliates are reinvested. Intra-company loans or the intra-company debt transactions refer to short- or longterm borrowing

and lending of funds between direct investors (or enterprises) and affiliate enterprises.

Topic 19. OPEN NETWORK FOR DIGITAL COMMERCE (ONDC) PROJECT

Importance for Prelims: Economy



The Government claims that ‘as UPI is to the digital payment domain, ONDC is to ecommerce in India.’ Details: ONDC is incorporated as a private non-profit (Section-8) company to establish the public digital infrastructure needed to expand access to India’s e-commerce ecosystem – pegged as a US\$200 billion opportunity by 2027.

- Now in its pilot phase, ONDC has been rolled out in 5 cities – Delhi NCR, Bengaluru, Bhopal, Shillong, and Coimbatore.
- It will be expanded to 100 cities by October 2022.
- ONDC was incubated by the Department for Promotion of industry and Internal Trade (DPIIT) at the standard Council of India.
- ONDC goes on the far side the current platform-centric digital commerce

model wherever the buyer and vender got to use the same platform or application to be digitally visible and do a business transaction.

- Thus, it's an alternative to platform aggregators like Amazon and Walmart-owned Flipkart, who have thus far monopolized India's e-commerce landscape.
- ONDC is to be based on open-sourced methodology, using open specifications and the open network protocols independent of any specific platform.
- The ONDC platform will allow buyers and sellers to connect and transact with each other online, no matter what other application they use.
- ONDC isn't platform-centric, and its objective is to match the online consumer's demand with the nearest available source of provide.
- Consumers will therefore find any vender, product, or service via any compatible application or platform – offering real freedom of choice.
- Thus, sellers and consumers would be able to use any compatible application of their choice for the exchange of data and carrying out transactions over ONDC.
- ONDC shall not mandate sharing of any transaction-level information by participants with ONDC.
- Will work with its participants to publish anonymised aggregate metrics on network performance without compromising on confidentiality and privacy.
- **Example:** Suppose a seller X is registered on platform A, while the consumer is registered on platform B, the consumer can directly purchase products of seller X without registering on platform A from the ONDC

What are the potential benefits of ONDC?

- **For sellers:** Access to more buyers Better discoverability of products and cost Autonomy in terms because of multiple choices for being digitally

visible Lower cost of doing business

- More options for value chain services like logistics and fulfillment
- **For Buyers:** Access to more sellers and so more choices better service and faster deliveries because of access to hyper-local retailers better customer expertise

What is ONDC not?

- A government regulatory body A super aggregator application or a platform A central intermediary A medium to help digitize business

What does 'open source' mean?

- To make a process or a software 'open source' implies that the technology or code deployed for the process is freely made available for everyone to use, redistribute, and modify.
- As an example, whereas the operating system of iOS is closed source (it can not be lawfully changed or used), the android operating system is open source, possible it potential for for smartphone manufacturers, such as Samsung, Nokia, Xiaomi, etc., to modify it for their respective hardware. ONDC aims at fostering open networks developed on open-sourced methodology, using open specifications and network protocols, and independent of any specific platform.

Topic 20. LOKPAL

Importance for Prelims: Polity



Lokpal to get a new office at World Trade Centre building Background: On March 19, 2019, Justice Pinaki Chandra Ghosh was appointed India's 1st Lokpal along with eight different members. The appointment itself was made 5 years when the Lokpal and Lokayukta Act was passed in 2013 to investigate cases of corruption against certain categories of public servants.

Lokpal and Lokayuktas Act 2013:

- The Act allows for setting up of anti-corruption ombudsman known as Lokpal at the Centre.
- **Composition:** The Lokpal will consist of a chairperson and a maximum of eight members.
- Chairperson should have been a Chief Justice of India, or is or has been a judge of the Supreme Court, or an eminent person who fulfils eligibility criteria as specified.
- 50% of the members are to be judicial members provided that not less

than 50% of the members belong to the Scheduled Castes, Scheduled Tribes, OBCs, minorities, and women.

- **Inquiry Wing:** Lokpal can have an Inquiry Wing for conducting preliminary inquiry into any offence alleged to be committed by a public servant punishable under the Prevention of Corruption Act, 1988.
- **Prosecution Wing:** It'll even have a Prosecution Wing for the prosecution of public servants in relation to any complaint by the Lokpal under this Act.
- **Powers:** The Lokpal can have the power of superintendence and direction over any investigation agency as well as CBI for cases referred to them by the ombudsman.
- As per the Act, the Lokpal can summon or question any public servant if there exists a prima facie case against the person, even before an investigation agency (such as vigilance or CBI) has begun the probe.
- Any officer of the CBI investigating a case referred to be it by the Lokpal, shall not be transferred without the approval of the Lokpal.
- An investigation must be completed within six months.
- However, the Lokpal or Lokayukta could permit extensions of six months at a time provided the reasons for the requirement of such extensions are given in writing.
- Special courts will be instituted to conduct trials on cases referred by Lokpal.
- **Jurisdiction of Lokpal:** It covers a wide range of public servants — from the Prime Minister (PM), ministers and MP, to groups A,B,C,D officers of the central government including the chairperson and members of the Lokpal.
- **However, there are some exceptions for PM:** Lokpal cannot inquire allegations against the PM relating to international relations, external and

internal security, public order, atomic energy and space.

- Also, complaints against the PM aren't to be probed unless the full Lokpal bench considers the initiation of inquiry and a minimum of 2/3rds of the members approve it.
- Such an inquiry against the Prime Minister (if conducted) is to be held in camera and if the Lokpal comes to the conclusion that the complaint deserves to be dismissed, the records of the inquiry aren't to be published or made available to anyone.
- **Selection committee:** Once the search committee submits its recommendation for the Lokpal and its members, a selection committee will consider those names and forward them to the President for his consideration.
- The five-member selection committee comprises the following –Prime Minister (chairperson), Lok Sabha Speaker, Leader of the Opposition, chief justice of India and an Eminent jurist nominated by the President.

Topic 21. COST OF INVASIVE SPECIES ON INDIAN ECONOMY

Importance for Prelims: Environment

As many as 10 invasive alien species (IAS), out of 330 that are known to be invasive in India, have cost the economy \$127.3 billion (Rs. 8.3 trillion) in the last 60 years, according to a recent analysis that points to glaring knowledge gaps in costs incurred by these species to the Indian economy.

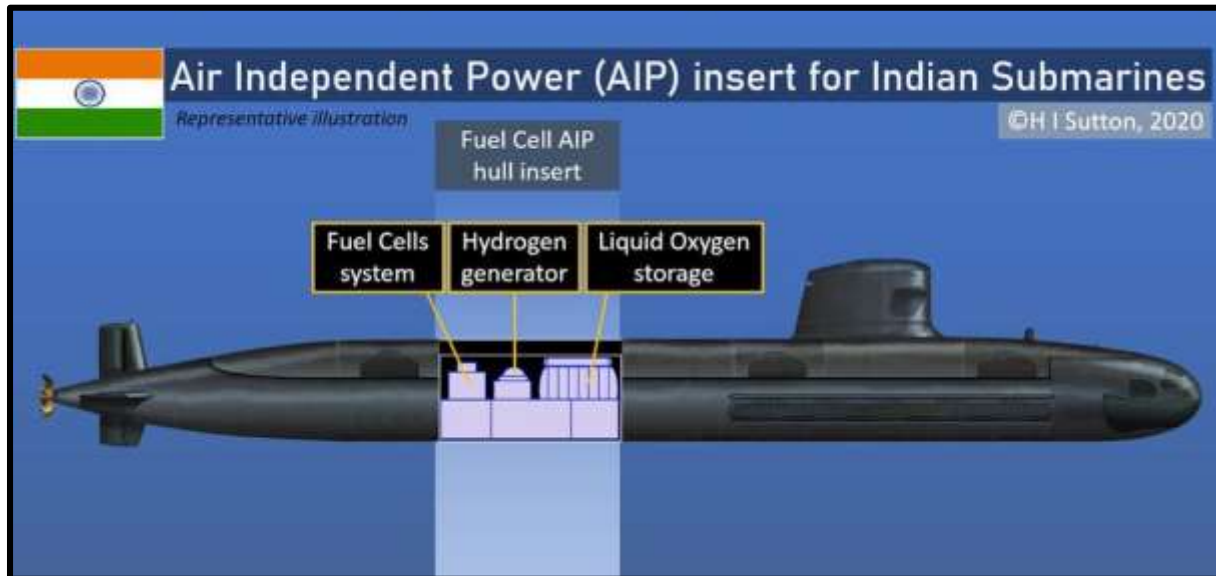
- As many as 330 species are declared invasive out of more than 2,000 alien species in India and the costs of \$127.3 billion as documented in the study comes from only 10 of these 330 species, making India the second top most invasion cost bearing country after the United States.
- The negative economic impacts are documented and available just for three-dimensional of the known invasive species and unavailable/masked/underrepresented for the rest ninety seven of invasive species in India.
- Based on this global analysis, going by India's GDP, we should have spent about \$3.4 trillion on invasive species in the last six decades; going by India's population, we must have spent about \$1,700 trillion in the last six decades.
- The analysis finds that invasions by semi-aquatic and aquatic taxa have been causing a bigger monetary burden to the economy compared to taxa inhabiting terrestrial ecosystems.
- The semi-aquatic costs were driven solely by one species, the yellow fever mosquito, reflecting the substantial human healthcare prices associated with this taxon.
- Adopting a 'whitelist' approach to import any living species—every non-native species is taken into account potentially dangerous until proved to be safe by a risk profiling—as in effect in the island nations is the more stringent and hence more effective in controlling potential invasions.

- In contrast, the more widely implemented approach of a ‘blacklist’, wherein every species is acceptable for import unless specifically banned, relies on scientists needing to prove that a species is problematic, with all the associated caveats when it might go against economic pressure.
- • as an example, lantana camara, a tropical american shrub with pretty flowers is considered one among the highest ten worst invasive species by the IUCN; escaping manicured gardens it's has stealthily made its home in India since its introduction in 1809 with an estimated cost of \$70 per hectare for its control. Besides, there is a concern over the “unexplored and silent impact” of invasive species in central India, east India and northeast India’s biodiversity-rich regions for which not even a single cost report is available.
- • So far, reports were solely focussed south, west and north India. Because, Western and southern India’s ties to travel, trade, and commerce – give opportunities for invasive species to hitch a ride into the country.
- The analysis shows that in India, as much as 35% of all costs are caused by animals, 15% by plants, 1% by fungi and bacteria, and the rest attributed to diverse/unspecified species- trends that are quite unusual when compared to the worldwide price distribution.
- All animal costs were caused by insects.
- Not one mammal, bird, fish, reptile or amphibian species, or none of the spiders, worms, crabs, snails and other gastropods are represented in these prices.
- though the number of invasive plant species (173 species) number invasive animals (157 species) in India’s invasive species list, the cost of invasive plants was 1,000 times less compared to invasive animals.
- • Most prices come from anthropocentric sectors such as fisheries, agriculture, health, social welfare, and administration.

- The costs related to forests and other non-anthropocentric ecosystems are almost absent.
- The impacts of invasive species are still under explored.
- With aedes mosquitoes causing some of the world's most threatening diseases, as an example, the main focus has always been on the effect (health) than on the cause (invasive species).
- The dialogue on fall army worm (*Spodoptera frugiperda*) is centred on an agricultural perspective, but not as an invasive species problem.
- One of the main reasons why invasive species can spread so fast to foreign lands is planetary warming.
- On the opposite hand, tackling the problem of invasive species can help in arresting the climate crisis as well.

Topic 22. AIP TECHNOLOGY FOR SUBMARINES

Importance for Prelims: Defence and Security



France’s naval group, one in every of 5 shortlisted Original equipment manufacturers (OEM) for the Navy’s P-75 India (P-75I) project to make six conventional submarines within the country, announced it'd not bid for the project. the reason was that the Request for Proposal (RFP) “requires that the fuel cell AIP can be sea proven, and therefore the French Navy doesn't use such a propulsion system.”

- **P75 & P75I Project:** In June 1999, the cabinet Committee on Security approved a 30-year plan for the Navy to indigenously build and induct twenty four submarines by 2030.
- In the 1st phase, 2 lines of production were to be established— the first, P-75; the second, P-75I.
- Each line was to produce six submarines. The contract for P-75 was signed in 2005 with the naval group, then known as DCNS, in partnership with Mazagon Dock Shipbuilders Ltd (MDL).
- • the first KalvariClass (Scorpene Class) submarine under the project was commissioned in December 2017.
- • Another 5 submarines are built since; the final one, Vagsheer, was

launched last month, and will be commissioned by late 2023.

- Whereas P-75 deliveries were delayed, P75I has seen long delays even before it's kicked off.
- The first Request for info was issued in 2008, then again in 2010, however the RFP was issued only in July 2021.
- • this will be India's 1st project under the Strategic Partnership Model—the government will give the contract to an Indian Strategic Partner (SP), which is able to partner with a foreign OEM to build the AIP-powered submarines in the country.
- **AIP Technology:** AIP refers to Air-Independent Propulsion, a technology for conventional— that's, non-nuclear — submarines.
- There are different types of AIP mechanisms available; what india is looking for under the P-75I project is AIP based on fuel cells.
- These cells can be convert chemical energy into electrical energy, recharging the batteries of the submarine.
- AIP has a force multiplier effect on lethality of a diesel electrical submarine because it enhances the submerged endurance of the boat several folds.
- Diesel electrical submarines should return to the surface or close to it (2-3 days) to run their generators to recharge the batteries that propel them under water.
- AIP may be a mechanism that allows the batteries to be charged even while the boat is submerged.
- However, even with AIP, the submarine needs to surface every 3 weeks or so (14 days).
- While the six P-75 submarines are diesel- electric, they can be fitted with AIP technology later in their lives.
- By the time P-75I is completed under the 30-year project, India is

projected to have six diesel-electric, six AIP-powered, and 6 nuclear attack submarines (yet to be built).

- India has been working to develop AIP technology indigenously as well.
- A tableaux of the DRDO (Defence Research and Development Organisation) at this year's Republic Day parade showcased AIP.
- In March 2021, the Defence Ministry had said DRDO had achieved an "important milestone in the development of AIP System by proving the land-based prototype".
- However, experts have certain doubts about it.
- Around ten countries have developed or are close to building AIP technology, and almost twenty nations have AIP submarines.
- **Concerns:** The Australian paper says "installing AIP can increase the length and weight of the boats, it requires pressurised liquid oxygen (LOX) storage on-board and supply for all three technologies".
- Also, "MESMA and thus the Stirling engine have some acoustic noise from the moving parts; and the...submarine's cost [increases] by around 10%."
- Second is that the requirement to demonstrate a sea-proven fuel cell AIP. whereas some manufacturers could have the technology, it's going to not be proven at sea yet.
- Another problem for the OEMs, sources aforesaid, is that the transfer of technology.
- Sources believe that the OEMs are unwilling to share all their expertise, particularly the niche technologies that they have built.

What submarines does India have now?

- India has sixteen conventional diesel-electric submarines, that are classified as SSKs.
- After the last 2 Kalvari class subs are commissioned under P-75, this number will go up to eighteen. ,

- India also has 2 nuclear ballistic submarines, classified SSBN.
- Of the sixteen SSKs, four are of Shishumar class, that were bought and then built in India in collaboration with the Germans starting 1980s; eight are kilo class or Sindhughosh class submarines bought from Russia (including erstwhile USSR) between 1984 and 2000; and 4 are Kalvari class in-built India at MDL.

Topic 23. GOVERNOR'S ASSENT TO BILL

Importance for Prelims: Polity

The State of Tamil Nadu has been witnessing a confrontation between the elected government and therefore the State Governor on the question of giving assent to the National Eligibility cum Entrance test (NEET) Bill passed by the State Assembly.

- **Assent to bills under article 200 (i.e. assent of the Governor to the bills passed by the state legislature):** Giving assent to a Bill passed by the legislature is a normal constitutional act performed by the Governor.
- The Governor is an appointee of the President, which means the Union government.
- Article 154(1) of the Constitution vests in the Governor the executive power of the State, he's required to exercise that power in accordance with the Constitution.
- In other words, the Governor can act only on the aid and advice of the Council of Ministers.
- While there is not much deviation from the language used in the Government of India Act of 1935 in the context of the powers of the British era Governors, It is a settled constitutional position that the Governor is only a constitutional head and the executive power of the State is exercised by the Council of Ministers.

When a bill is sent to the governor after it is passed by state legislature, he can:

- a) Give his assent to the bill, or
 - b) Withhold his assent to the bill, or
 - c) Return the bill (if it is not a money bill) for reconsideration of the state.
- However, if the bill is passed again by the state legislature with or

without the amendments, the governor has to give his assent to the bill, or Reserve the bill for the consideration of the president(article 201).

- In one case such reservation is obligatory, that is, where the bill passed by the state legislature endangers the position of the state high court.

In addition, the governor can also reserve the bill if it is of the following nature:

- I. Ultra-vires, that is, against the provisions of the Constitution.
- II. Opposed to the Directive Principles of State Policy.
- III. Against the larger interest of the country.
- IV. Of grave national importance.
- V. Dealing with compulsory acquisition of property under Article the Constitution.

Topic 24. ANTI-DEFECTION LAW

Importance for Prelims: Polity

Recent report by NGO Association for Democratic Reforms (ADR) says that close to ninety per cent of the MLAs across Uttar Pradesh, Uttarakhand, Manipur and Punjab, who recontested within the 2022 Assembly polls after switching parties saw their wealth grow between the year 2017 and 2022

- **Anti-Defection Law:** The 52nd Amendment Act of 1985 added the 10th Schedule to the Constitution.
- This act is commonly referred to as the 'anti-defection law'.
- The 52nd Amendment Act provided for the disqualification of the members of Parliament and the state legislatures on the ground of defection from one political party to another.
- **Provision of the Anti-defection Act:** A member of a House belonging to any political party becomes disqualified for being a member of the House; If he voluntarily gives up his membership of such a political party.
- If he votes or abstains from voting in contrary to any direction issued by his political party without obtaining prior permission of the party.
- **Independent Members:** An independent member becomes disqualified if he joins any political party after such election.
- **Nominated Members:** A nominative member of a House becomes disqualified for being a member of the House if he joins any political party after the expiry of six months from joining the house.
- This means that he may join any political party within six months of taking his seat in the House without inviting this disqualification.
- **Exceptions:** The above disqualification on the ground of defection doesn't apply in the following 2 cases: If a member goes out of his party as a result of a merger of the party with another party.

- A merger takes place when 2/3rd of the members of the party have agreed to such merger.
- If a member, after being elected as the presiding officer of the House, voluntarily gives up the membership of his party or rejoins it.
- **Deciding Authority:** Any question regarding disqualification arising out of defection is to be decided by the presiding officer of the House (Speaker or Chairman of the House).

Topic 25. MERCY PETITION

Importance for Prelims: Polity

President has no role to play in Perarivalan's plea, says SC Observation of Court: Supreme Court disagreed with the Central government's suggestion that the court ought to wait until the President took a turn Rajiv Gandhi assassination case convict A.G. Perarivalan's the mercy plea referred to him by the Tamil Nadu Governor for a decision. under Article 161 of the Constitution, the Governor was bound by the help and the aid given by the Tamil Nadu Council of Ministers in September 2018 to the Governor to release Perarivalan, who has already served over thirty years of his life sentence. The Governor prima facie had been no authority to transfer the mercy plea to the President. There was no role for the President in here under the Constitution.

What is Mercy petition?

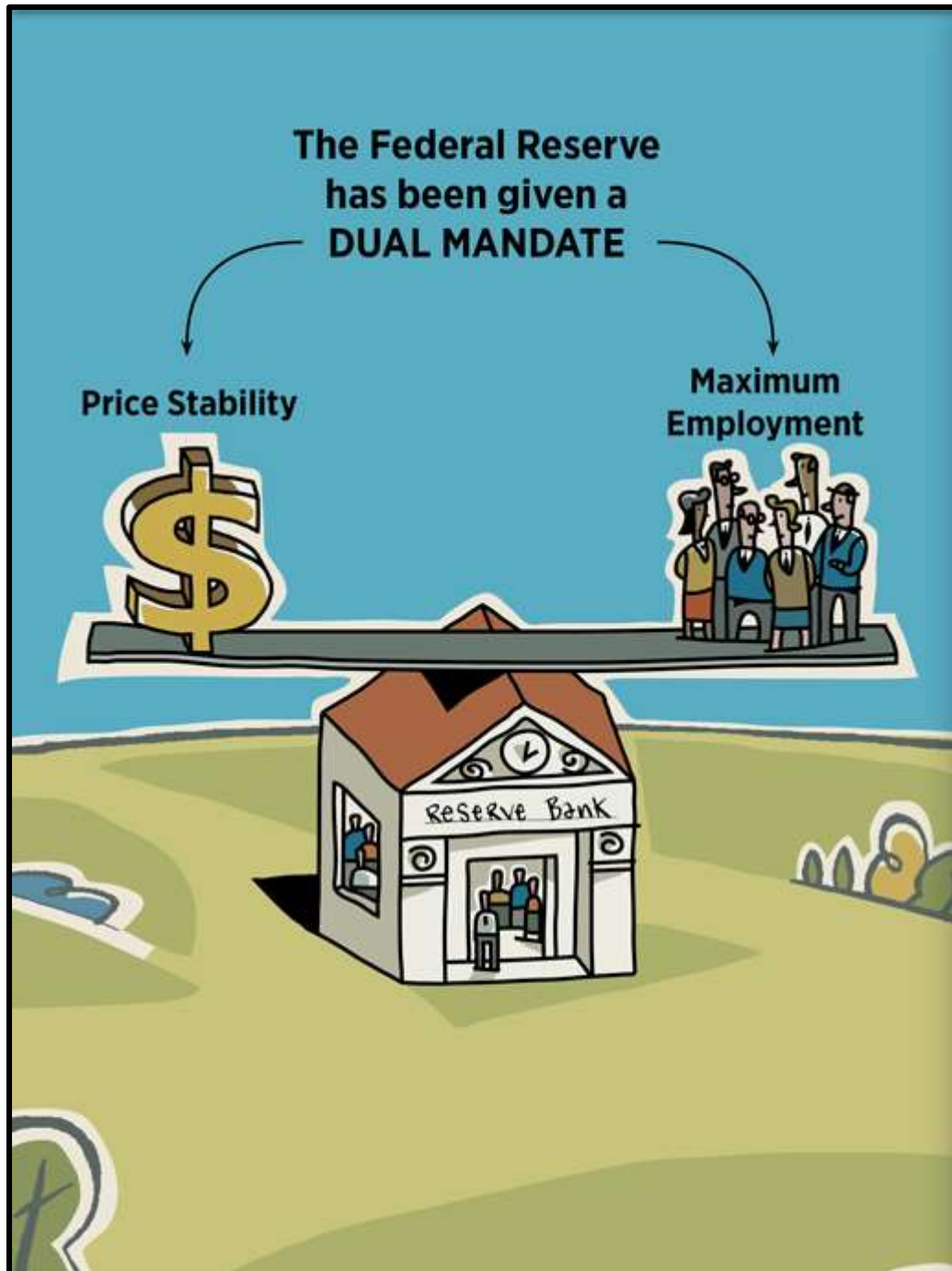
- A mercy petition is filed by a convict to change his/her punishment (especially capital) into a lesser form of punishment.
- It is also called clemency petition/plea or executive clemency.
- Mercy Petition is exercised in the end the legal remedies were exhausted.
- (Legal remedies include all the remedies available under the prevailing law and Constitution).
- A petition can be filed with the President (under Article 72 of the Indian Constitution) or the governor (under Article 161 of the Constitution).
- Procedure to file a Mercy petition: After extinguishing all the reliefs in the court of law, either the convict in person or his relative on his behalf may submit a written petition to the President.
- The petitions are received by the President's secretariat on behalf of the President, that is then forwarded to the Ministry of Home Affairs for their comments and recommendations.
- The Home Ministry in consultation with the concerned State

Government discusses the merits of the petition.

- After the consultation, recommendations are made by the Union Home Minister and then, the petition is sent back to the President for his decision.
- Even if the President and Governor are the executive heads, however they can't exercise their discretion with regard to their powers under Articles 72 and 161.
- Both the executive heads are required to act on the advice of CoM
- The advice of the appropriate Government binds the Head of the state.
- **Pardoning Power of the President Pardon:** The president can totally acquit the person for the offence and let him go free like a normal citizen.
- **Commute:** to reduce the type of punishment into a less harsh one.
- **For example Rigorous imprisonment to simple imprisonment.**
- **Remission:** to reduce the punishment while not changing the nature of the punishment.
- For example twenty years rigorous imprisonment to ten years rigorous imprisonment.
- **Reprieve:** A delay is allowed in the execution of a sentence, typically a death sentence for a guilty person to prove his innocence.
- **Respite:** reduce the degree of punishment looking at specific grounds like pregnancy, old age etc.

Topic 26. FED RESERVE MONETARY POLICY

Importance for Prelims: Economy



The federal reserve raised interest rates by the steepest increment since 2000 and decided to start shrinking its massive balance sheet, deploying the foremost aggressive tightening of monetary policy in decades to control soaring inflation.

- **Decisions taken:** Increase Benchmark rate– The increase in the Federal

Open Market Committee's target for the federal funds rate, to a range of 0.75% to 1%, follows a quarter-point hike in March that ended 2 years of near-zero rates to help cushion the U.S. economy against the initial blow from the Covid-19.

- Reduce Balance sheet– by selling the Treasuries and mortgage-backed securities.
- The balance sheet had ballooned in size because the Fed aggressively bought securities to calm panic in financial markets and keep borrowing costs low as the pandemic spread.
- **Impact:** These twin measures will reduce the quantity of surplus liquidity in the system as well as increase the cost of funds.
- **Fed Reserve and the Monetary Policy:** The Federal Reserve Act of 1913 gave the Federal Reserve responsibility for setting monetary policy.
- The federal reserve controls the 3 tools of monetary policy–open market operations, the discount rate, and reserve requirements.
- The Board of Governors of the federal reserve System is responsible for the discount rate and reserve requirements, and also the Federal Open Market Committee is responsible for open market operations. using the 3 tools, the federal reserve influences the demand for, and supply of, balances that depository institutions hold at federal reserve Banks and during this way alters the federal funds rate.
- The federal funds rate is the interest rate at which depository institutions lend balances at the Federal Reserve to other depository institutions overnight.
- **Impact/Policy implications:** Changes in the federal funds rate trigger a chain of events that affect other short-term interest rates, foreign exchange rates, long-term interest rates, the amount of y and credit, and, ultimately, a range of economic variables, including employment, output,

and costs of goods and services.

- Structure of the FOMC The Federal Open Market Committee (FOMC) consists of twelve members– The seven members of the Board of Governors of the Federal Reserve System; The president of the Federal Reserve Bank of New York; and The four of the remaining eleven Reserve Bank presidents, who serve one-year terms on a rotating basis.
- Nonvoting Reserve Bank presidents attend the meetings of the Committee, participate in the discussions, and contribute to the Committee’s assessment of the economy and policy options. The FOMC holds eight regularly scheduled conferences per year.
- At these meetings, the Committee reviews economic and financial conditions, determines the appropriate stance of monetary policy, and assesses the risks to its long-run goals of price stability and sustainable economic growth.
- **Goals:** The Federal Open Market Committee (FOMC) is firmly committed to fulfilling its statutory mandate from the Congress of promoting maximum employment, stable prices, and moderate long-term interest rates.

Topic 27. RBI RATE HIKE

Importance for Prelims: Economy

WHAT THE RATE HIKE MEANS

- Fixed deposits will fetch more in coming months, will also influence PPF & EPF returns
- May dampen demand in sectors like housing & automobiles
- Full impact to be visible over next 6-8 months
- With other countries too raising rates, 'competitive rates' in India will have a bearing on FII investment

CURRENT RATES

SBI FD rate:
5.5%*

HDFC:
6.7^

* Highest rate, currently for deposits of over 5 years
^ Lowest rate

“ Food inflation pressures are likely to continue... Spillovers from global wheat shortages are impacting domestic prices, even though domestic supply remains comfortable.... Prices of edible oils may firm up further...
—RBI GUV SHAKTIKANTA DAS



The RBI's rate setting panel on Wednesday announced an 'off-cycle' increase in the benchmark interest rates.

- Rise in Repo Rate– by 40 basis points to 4.4% with immediate effect. Increase in the cash reserve ratio (CRR) by 50 basis points (bps) from 4 per cent to 4.50 per cent.
- **Causes:** Russia's invasion of Ukraine and the subsequent western sanctions on Moscow led to supply chain disruption and cost push inflation.
- Indian households' perception and expectations of inflation have been running well above the RBI's upper tolerance threshold of 6% for more than two years..
- Fed policy normalisation causing capital outflows Heightening the risks

of imported inflation due to new COVID infections India's Monetary Policy Framework holds RBI responsible and accountable, should retail inflation overshoot the 6 per cent target for three consecutive quarters.

- **Impact:** Rise lending rate- as repo rate is linked to lending rate Rise deposit rate Reduce liquidity Eliminate capital outflow Deanchor inflation expectation Rise in bond yield Currency appreciation Issue: Unsuccessful earlier efforts -despite RBI's attempts to soak up liquidity through the VRRR and SDF windows, domestic liquidity has remained in the surplus.
- Cost Pull Inflation-Present inflation is mainly supply led therefore, managing demand side variables won't quickly be transmitted to lower inflation.
- Stagflation- actions might hold back recovery without much effective decline in inflation, leading the economy to Stagflation.
- Capital outflows- on the backdrop of rising Fed policy rate and capital might continue to leave Indian Territory.
- Chances of perverse policy-as change in inflation expectation caused mainly because of changes in price of daily use items therefore, reflect a transitory inflation.
- Fiscal-monetary conflict- as tightening monetary policy would increase cost of borrowing for government Crowd out effect of tight monetary policy- as cost of borrowing would rise leading to decline in private consumption and investment.
- Output gap is still negative- as output is below full-capacity production because of COVID pandemic.
- Alternatives Selective Credit Control measures by the RBI Pro-growth measure — a reduction in fuel taxes by both Central and State governments to neutralise the adverse impact of the rise in international crude oil costs on the wake of record collections in the GST.

Supply Chain Diversification and ease supply RBI Inflation Targeting:

- Inflation Targeting is a monetary policy framework wherein the Central Bank of a country focuses only on maintaining the rate of Inflation within a targeted range.
- The principle of the inflation targeting is based on the belief that long-term economic growth is best achieved by maintaining price stability, and price stability is achieved by controlling inflation.
- Inflation targeting was first adopted by New Zealand and subsequently, a large number of countries including India have been following Inflation Targeting as their core element of monetary policy.
- In case of India, the flexible Inflation targeting was introduced through the Monetary Policy Framework Agreement signed between the RBI and Government in 2015.
- As per terms of the agreement, RBI's primary objective would be to maintain price stability, while keeping in mind the objective of growth.
- The RBI is required to maintain a rate of inflation of 4% with a deviation of 2% i.e. inflation has to be maintained between 2% to 6%.
- The Reserve Bank of India Act, 1934 was amended to provide a statutory basis for a FTI framework.
- The amended Act provides for the inflation target to be set by the govt, in consultation with the tally, once every 5 years.
- **Monetary Policy Committee:** It is a statutory and institutionalized framework under the Reserve Bank of India Act, 1934, for maintaining price stability, while keeping in mind the objective of growth.
- The Governor of Reserve Bank of India is ex-officio Chairman of the committee.
- The MPC determines the policy rate of interest (repo rate) required to

achieve the inflation target (4%). Traditional measures to control inflation by the RBI In the Indian Economy, RBI is the sole authority that decides the money supply in the economy.

- And to control this, RBI implements the monetary policy's Quantitative and Qualitative instruments to achieve economic goals- The quantitative instruments are also known as general tools used by the RBI (Reserve Bank of India).
- As the name suggests, these instruments are related to the quantity and volume of the money.
- These instruments are designed to control the total volume/money of the bank credit in the economy.
- Bank rate is the minimum rate at which the central bank lends money and rediscounts first-class bills of exchange and securities held by commercial banks.
- Legal Ratio-To maintain liquidity and to manage credit in the economy, the Reserve Bank of India also keeps a certain amount of cash reserves.
- These reserve ratios are known as SLR (Statutory Liquidity Ratio) and CRR (Cash Reserve Ratio), increase in both of these ratios lead to decline in inflation.
- Liquidity Adjustment Facility-It is a monetary policy tool used largely by the reserve bank of India (RBI) that controls the liquidity of money supply in the economy.
- It is done by either allowing banks to borrow money via repurchase agreements (repos) or lend loans to the RBI via reverse repo agreements.
- **There are two main components of Liquidity Adjustment Facility (LAF): Repo Rate:**
 - It is the rate at which the Reserve Bank of India (RBI) lends to other banks.
 - **Reverse Repo Rate:** it's the rate at that the reserve bank of India (RBI)

borrow from commercial banks.

- It is conducted at a fixed and variable rate.
- The Marginal Standing Facility (MSF)- refers to the facility under which scheduled commercial banks can borrow an additional amount of overnight money from the central bank over and above what is available to them through the LAF. The MSF rate is pegged a hundred basis points or a percentage point higher than the repo rate.
- Standing Deposit Facility (SDF) –It is an extra tool for absorbing liquidity.
- It is the same as reverse without any collateral.
- It'll replace the fixed rate reverse repo (FRRR) because the floor of the LAF corridor. Qualitative instruments are also known as selective instruments of the RBI's monetary policy.
- These instruments are used for discriminating between various uses of credit; for example, they will be used for favouring export over import or essential over non-essential credit supply.
- RBI fixes a credit amount to be granted for commercial banks.
- Reserve Bank of India fixes a credit amount to be granted for commercial banks.
- For certain purposes, the upper credit limit can be fixed, and banks have to stick to that limit.
- This helps in lowering the bank's credit exposure to unwanted sectors. Regulation of consumers' credit-consumers' credit supply is regulated through the instalment of sale and hire purchase of consumer goods. Change in Marginal Requirement-Margin is referred to the certain proportion of the loan amount that's not offered or financed by the bank.
- Change in margin can lead to change in the loan size.

- This instrument is used to encourage the credit supply for the necessary sectors and avoid it for the unnecessary sectors.
- That can be done by increasing the marginal of unnecessary sectors and reducing the marginal of other needy sectors.
- Moral suasion refers to the suggestions to commercial banks from the Reserve Bank of India that helps in restraining credits in the inflationary Period.
- RBI implies pressure on the Indian banking system without taking any strict action for compliance with rules.
- Instruments Rise-(instrument) Fall-(instrument) Liquidity and the inflation bank rate falls rises SLR (Statutory Liquidity Ratio) falls rises CRR (Cash Reserve Ratio) falls rises Repo Rate falls rises Reverse Repo Rate falls rises The Marginal Standing Facility (MSF) falls rises Standing Deposit Facility (SDF) falls rises

Topic 28. NRI INVESTMENTS

Importance for Prelims: Economy



Investment made by an Indian entity that's owned and the controlled by an NRI on a no repatriation basis won't be thought of for the calculation of indirect foreign investment, the department for the promotion of industry and internal trade said in a notification. Hitherto, non-repatriable NRI investments in Indian companies have not been counted as FDI but downstream investments by such firms retained the FDI tag.

Details: NRI investments that are repatriable are thought of FDI whereas non-repatriable investments are thought of domestic investment. Investments by NRIs on a non-repatriation basis as stipulated under Schedule IV of foreign

exchange Management (non-debt instruments) Rules 2019 are deemed to be domestic investment at par with investments made by residents. Accordingly, an investment made by an Indian entity which is owned and controlled by NRI(s) on a repatriation basis shall not be considered for calculation of Indian foreign investment. An Indian company is one that's both “owned” and “controlled” by resident Indians and violating anyone condition makes the company foreign-owned. Investment on repatriation basis means that the sale or maturity proceeds of an investment, net of taxes, are eligible to be transferred out of India. in case of non-repatriation investments, this can't be transferred out of the country.

NRIs have many investment options in India :

- Non-Resident External (NRE) scheme– NRE account is a rupee account, offering complete security
- These accounts can be in the form of savings, current, recurring, or fixed deposits.
- The currency risk is on the depositor.
- It is financed from abroad income through inward remittances Money can be fully repatriated (sent back) abroad without restrictions, Given the attractive post-tax return, NRE temporary deposits are very popular with non-residents.
- Non-Resident Ordinary (NRO) scheme– The NRO account is also a rupee account, This account allows NRIs to receive funds in either Indian or foreign currency.
- However, only Indian currency can be withdrawn as NRO Accounts are kept in Indian currency
- It's generally financed by income earned in India or from Indian assets
- There are restrictions on repatriation i.e. remittances outside India are allowed only up to \$1 million under the automatic route, while higher

remittances require RBI approval.

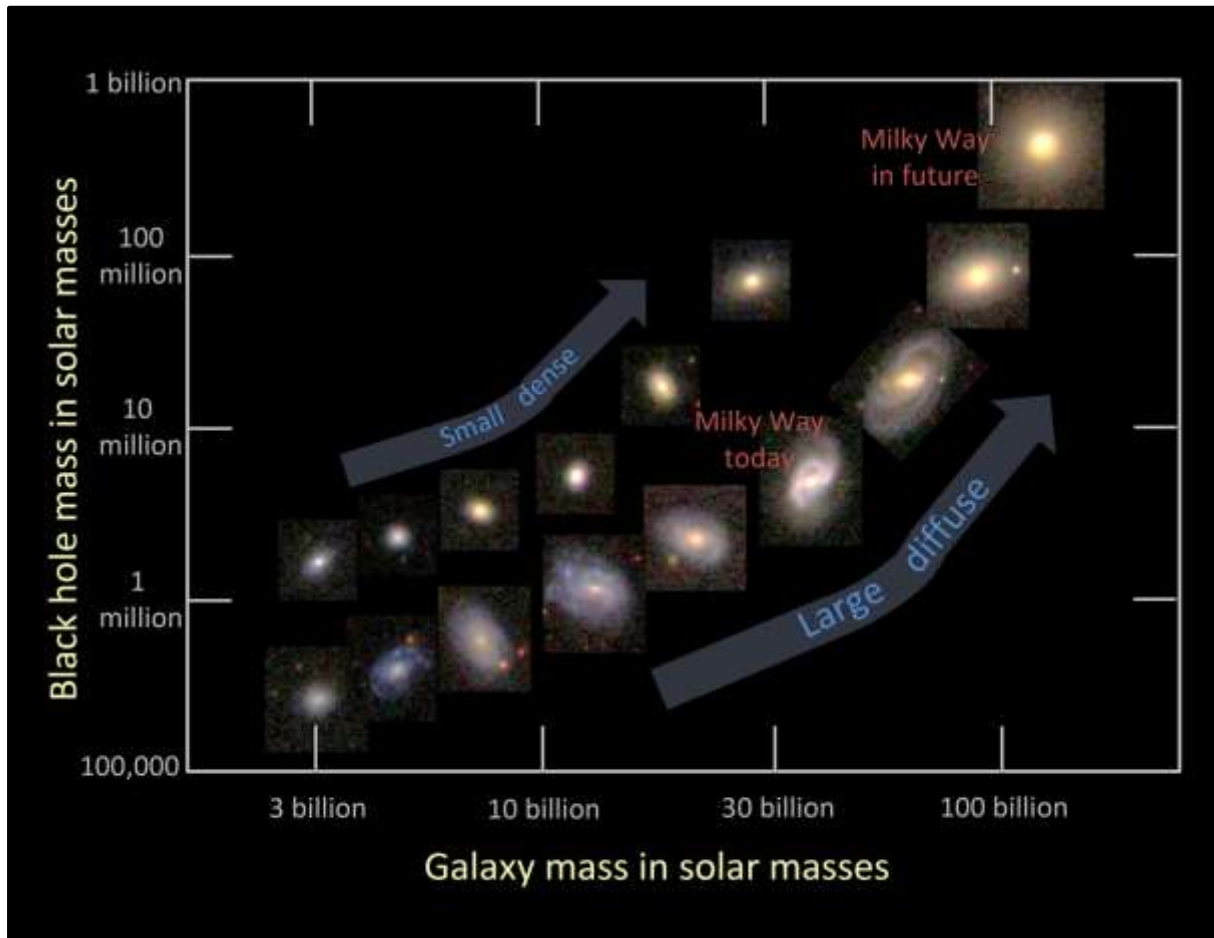
- Unlike the NRE account, interest accrued on NRO account are taxable, this is not preferred by most NRIs. FCNR (foreign currency) scheme.
- These accept any permitted foreign currency.
- FCNR Accounts are Term Deposit Accounts and not Saving Accounts.
- The currency risk (change in price of 1 currency in relation to another) is borne by the bank.
- They are fully repatriable (ability to move money abroad).
- NRI investments on a repatriation basis in Indian companies are considered as FDIs, and are subject to regulations and caps.
- Portfolio Investment scheme Foreign Institutional Investors (FIIs), Non-Resident Indians (NRIs), and Persons of Indian Origin (PIOs) are allowed to invest in the primary and the secondary capital markets in India through the portfolio investment scheme (PIS).
- Under this scheme, FIIs/NRIs can acquire shares/debentures of Indian companies through the stock exchanges in India.
- The ceiling for overall investment for FIIs is twenty four % of the paid up capital of the Indian company and ten per cent for NRIs/PIOs.
- The limit is twenty % of the paid up capital in the case of public sector banks, including the state bank of India.
- The ceiling of twenty four per cent for FII investment is raised up to sectoral cap/statutory ceiling, subject to the approval of the board and the general body of the company passing a special resolution to that the effect.
- And also the ceiling of ten per cent for NRIs/PIOs can be raised to twenty four per cent subject to the approval of the general body of the company passing a resolution to that effect.
- **NRI in Government Securities:** The Reserve Bank of India (RBI) has introduced a separate channel called Fully Accessible Route (FAR) to

enable non-residents to invest in specified Government of India dated securities with effect from April 1, 2020 Non Resident investors will invest in specified government securities without being subject to any investment ceilings.

- **This scheme shall operate along with the two existing routes:** The Medium Term Framework (MTF) for Foreign Portfolio Investment (FPI) in Central Government Securities (G-secs) and State Government Securities (SDLs) was introduced in October 2015. FPI consists of securities and other financial assets passively held by foreign investors.
- The Voluntary Retention Route (VRR) encourages Foreign Portfolio Investors to undertake long-term investments in Indian debt markets.

Topic 29. NEW INSIGHTS EVOLUTION OF GALAXIES

Importance for Prelims: Science and technology



A study has shown that supermassive black holes may be playing an essential role in the evolution of their host galaxies.

What is a galaxy?

- A galaxy could be a sprawling space system which is composed of stars, dust, interstellar gas, stellar remnants, and dark matter and every one held together by gravity.
- The universe has many galaxies, and each carries numerous stars which are bounded by a unique force known as gravitational force.
- The solar system where our earth exists is in the Milky Way Galaxy.
- Galaxies differ from each other in shape, size, colour and composition. There are three types of galaxies that we find in the universe. i.e.

Elliptical Galaxies, Spiral Galaxies and Irregular Galaxies.

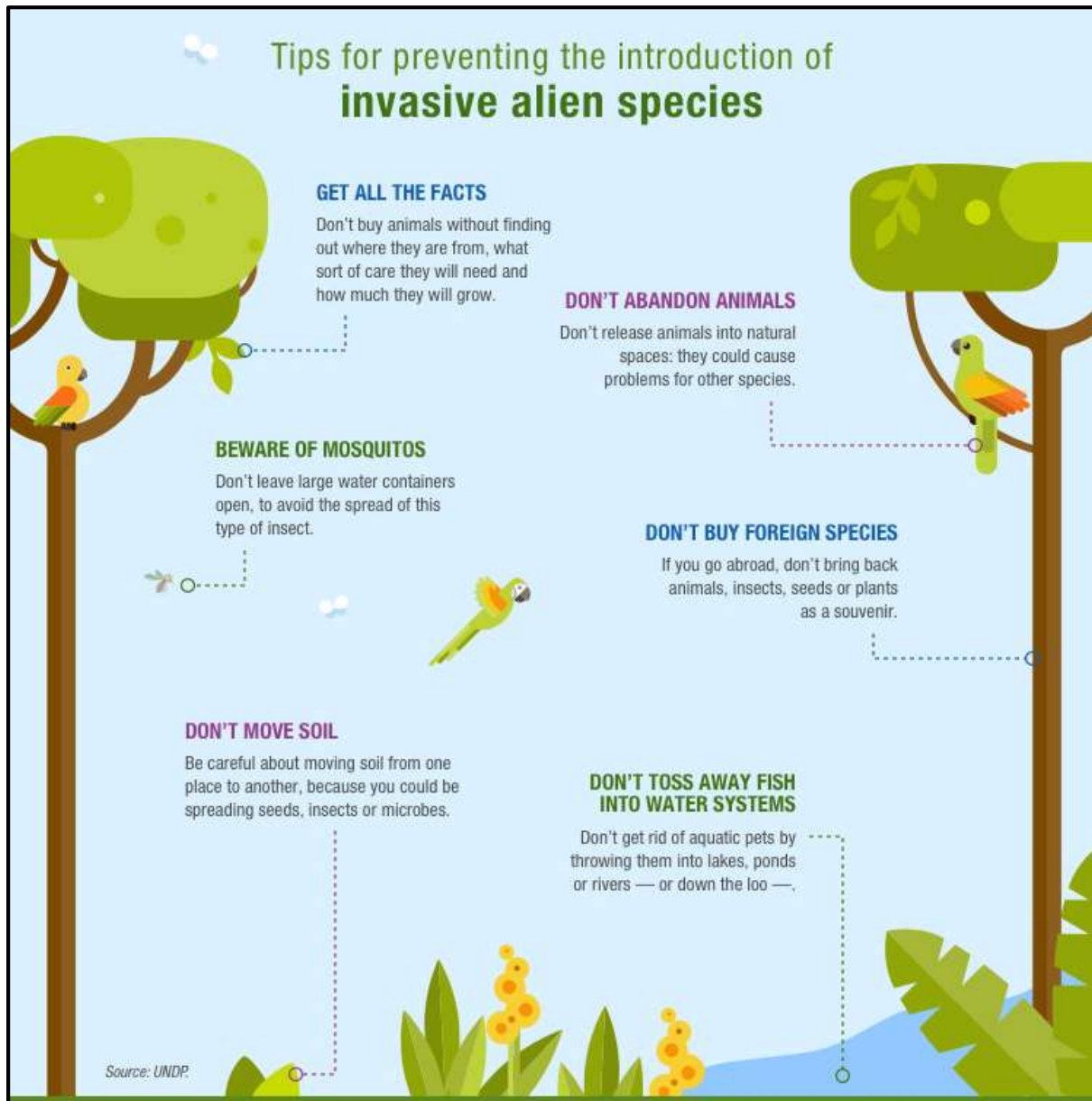
- New insights in the evolution of galaxy Supermassive black holes at the centres of galaxies are known to give rise to fast-moving jets of relativistic particles that can traverse large distances through the galaxy and beyond.
- The jets have long been suspected of driving the evolution of galaxies.
- A new study by an international team of astronomers, including Dipanjan Mukherjee from the Pune-based Inter-University Centre for Astronomy and Astrophysics (IUCAA), has unravelled the mystery.
- It's shown that even a relatively weak jet from a supermassive black hole will clear the nuclear region of the galaxy of its gas, indicating that they'll be playing an essential role in the evolution of their host galaxies.

What are black holes ?

- Black holes are extraordinarily dense objects possessing the gravitational pulls so powerful even light cannot escape them.
- It refers to a point in space wherever the matter is thus compressed as to create a gravity field from that even light cannot escape.
- **The black holes belong to two categories:** One category ranges between a few solar masses and tens of solar masses.
- These are thought to form when massive stars die.
- The other category is of supermassive black holes.
- These range from hundreds of thousands to billions of times that of the sun from the Solar system to which Earth belongs.

Topic 30. INVASIVE ALIEN PLANTS CAN THREATEN WATER SUPPLY

Importance for Prelims: Environment



The study predicted that clearing catchment areas fully infested with mature invasive alien trees can increase streamflow by between 15.1% and 29.5%. Alien species and water to find out how much alien trees threaten water supply, a hydrological study was conducted.

- The researchers set up the foremost fine-scale, detailed models possible

to try and estimate however alien trees affect stream flow in four small mountain catchments higher than some of Cape Town's major dams.

- The models predicted that clearing catchment areas fully infested with mature invasive alien trees can increase stream flow by between 15.1% and 29.5%.
- The study also found that stream flow gains from clearing alien trees from rivers were almost twice as high as clearing the alien trees from the surrounding land.
- That's because alien trees in rivers have access to an almost the endless water supply and so use more.
- **What are invasive Alien Species (IAS):** An alien species is a species introduced outside its normal distribution.
- An alien species becomes 'invasive' when they are introduced deliberately or accidentally outside their natural areas, where they out-compete the native species and upset the ecological balance.
- Invasive alien species (IAS) are animals, plants or other organisms that are introduced into places outside their natural range, negatively impacting native biodiversity, ecosystem services or human well-being.
- The most common characteristics of invasive species are rapid reproduction and growth, high dispersal ability, ability to survive on various food types, and in a wide range of environmental conditions and therefore the ability to adapt physiologically to new conditions, called phenotypic plasticity.
- The alien invasive of species are non-native to an ecosystem. They may cause economic or environmental harm or even adversely affect human health.
- IAS are the foremost common threat to amphibians, reptiles and mammals on The IUCN Red List; they'll lead to changes in the structure

and composition of ecosystems detrimentally affecting ecosystem services, human economy and well being.

- IAS are such a problem that Aichi biodiversity Target nine and one clause of United Nations sustainable Development Goal fifteen – Life on land specifically address the problem.

Topic 31. WORLD PRESS FREEDOM INDEX

Importance for Prelims: Governance



India's ranking in the 2022 World Press Freedom Index has fallen to 150 out of 180 countries, according to the latest report released by the global media watchdog, Reporters Without Borders (RSF). In last year's report, India was ranked 142. The top 3 positions for countries with the highest press freedom were taken by the Nordic trio of Norway (a score of 92.65), Denmark (90.27) and Sweden (88.84).

- It ranks 180 countries, topped by Norway followed by Finland and Denmark, while Eritrea is at the bottom.
- China is ranked 177, and is only above North Korea at 179 and Turkmenistan at 178.

- In the South Asian neighbourhood, Nepal is at 106, Sri Lanka at 127, Myanmar (before the coup) at a hundred and forty, Pakistan at one hundred forty five and Bangladesh at 152.
- The report said that Asia Pacific's authoritarian regimes have used the Covid-19 pandemic to perfect their methods of totalitarian control of information.
- India has not slipped further on the World Press Freedom Index 2021.
- India is ranked 142 after it had consistently slid down from 133 in 2016.
- About World Press Freedom Index It is an annual report published every year since 2002 by Reporters Without Borders (RSF).
- RSF is an international NGO whose self-proclaimed aim is to defend and promote media freedom.
- Headquartered in Paris, it has consultative status with the United Nations It is a qualitative analysis combined with quantitative data on abuses and acts of violence against journalists during the period evaluated.
- The RSF defines press freedom as “the ability of journalists as individuals and collectives to select, produce, and disseminate news in the public interest independent of political, economic, legal, and social interference and in the absence of the threats to their physical and mental safety.
- The countries are given scores ranging from zero to one hundred, with zero being the most effective possible score and one hundred the worst, ever since the 2013 index.
- The Index ranks 180 countries and regions according to the level of freedom available to journalists.
- It does not rank public policies even if governments obviously have a major impact on their country's ranking.

Topic 32. LENDING RATE

Importance for Prelims: Economy

Close on the heels of the Reserve Bank of India's decision to hike the policy repo rate and cash reserve ratio, banks have started hiking lending rates with ICICI Bank and the Bank of Baroda (BoB) kicking off the exercise.

- Bank of Baroda has hiked repo-linked lending rate (RLLR) by forty basis points to 6.9 per cent.
- Bank of India and central bank of India also raised RLLR by forty basis points to 7.25 per cent. several banks announced deposit rate hikes across multiple tenor baskets for retail customers.
- **Cause:** Hike in Repo Rate- As per an October 2019 circular from RBI, banks linked their retail loans to external benchmark lending rates (EBLR).
- As a result, most banks have adopted the repo rate as their benchmark.
- As banks borrow money from the Reserve Bank of India at the repo rate, any change in the repo rate affects the lending rate of banks.
- Impact of Repo Rate hike: Monthly installments (EMIs) on home, vehicle and other personal and corporate loans are likely to go up, due rise in lending rate.
- Deposit rates, mainly fixed term rates, are also set to rise. Reduce liquidity and inflation Reduce growth and increase unemployment
Okun's Law: Okun's law is an observed relationship between a country's

GDP (or GNP) and employment levels.

- It had been coined by Arthur Okun, a Yale economist who served on President Kennedy's council of economic advisors.
- Okun's law predicts that a 1% drop in employment tends to be accompanied by a drop in GDP of around 2%.
- Likewise, a 1% increase in employment is associated with a 2% GDP increase. In the case of India— information on unemployment rate and real gross domestic product growth from 1980-81 to 2019-20 suggest that a decline in GDP growth by one percentage point will increase the unemployment rate by around 0.13 percentage points.
- Repo rate linked Lending rate: Banks offer loans at a certain rate of interest.
- If this rate of interest is linked to the repo rate, it's known as repo linked lending rate (RLLR).
- From first October 2019 onwards, all the new floating retail loans interest rates like personal loans, education loans, car loans, home loans etc., sanctioned by the financial institutions got linked to the external benchmark wherein one of the benchmarks is the central bank's repo rate. Each and every bank has its own RLLR, that keeps differing when the Reserve Bank of India revises its repo rate.
- $RLLR = \text{RBI's repo rate} + \text{Margin/spread charged by the bank}$ Banks may address RLLR by other terms, such as EBLR (External Benchmark Linked Rate), RBLR (Revised Repo Rate Lending Rate) etc.
- The margin or spread that the bank charges stays the same for all the loan applicants.
- However, based on the RBI circular, banks have the permission to charge their borrowers risk premium.
- The risk premium that the banks charge to the borrower is based on their

risk analysis considering a particular applicant and differs from one applicant to another.

- **MCLR linked lending rate:** The marginal costs of the funds-based lending rate (MCLR) is an internal benchmark that determines the interest rate on loans based on the marginal cost of funds, loan tenure premium, operating costs, and the Cash Reserve Ratio (CRR).
- $MCLR = \text{Rate of interest offered by the bank on one-year term deposit} + \text{tenure premium} + \text{CRR} + \text{operating costs}.$
- MCLR linked interest rates get affected whenever the repo rate is revised by the RBI.
- Banks can increase or decrease the MCLR depending upon the changes in the repo rate.
- Before the introduction of MCLR in 2016, banks did not use to consider the repo rate for base calculations.
- They relied on CASA (Current accounts and Savings accounts) for the calculating the lending rates.
- Marginal Cost of Funds Based Lending Rate (MCLR) was the first attempt to link the repo rate to the loan interest rates closely.
- However, it's been observed that borrowers are often late in receiving the benefits of repo rate cuts in the sort of lower interest because of time lag in implementing these changes.
- As a result, the entire benefit of repo rate cuts might not pass on to a borrower in the MCLR linked interest rate format.

Why has RLLR replaced MCLR?

- RLLR based loans were introduced by RBI to make sure that the loan applicants have accessibility to a completely transparent benchmark.
- Quicker rate cuts transmission plays a major role among many applicants to opt for the RLLR option instead of MCLR.
- Repo rate linked lending rate MCLR linked lending rate RLLR is an

external benchmark, whereby the bank's own funds cost doesn't have any impact directly once the repo rate rises or falls MCLR is banks' internal benchmark where their own funds' cost decides their MCLR i.e. g-sec rates, low-cost deposits, and the liquidity in the banking system, etc., determines its MCLR.

- RLLR linked loans, the reset period of rates is at least 3 months.
- MCLR's reset period is typically twelve months, whereas few lenders reset it every six months.
- It gives time lag to the MCLR linked loans.
- The spread is based on the risk group of the applicants and the loan amount opted for. Lenders are permitted to charge spread, margin or mark up.
- For instance, if the MCLR of a bank equals 7 %, then it might lend at 8 % after factoring in 100 basis points of mark upcharge.
- Borrowers can track the benchmark rates themselves.
- Borrowers have to rely on their bank to inform them about rate changes.
- Loan interest rates are volatile.
- Loan interest rates are relatively stable.

Topic 33. LIQUIDITY OVERHUNG

Importance for Prelims: Economy

Dominance of ample system level surplus liquidity, resulting in a large liquidity increase in the net Reserve Bank of India

- **Cause:** Credit to government -The increase in the net RBI credit to the government could be on account of large monetary accommodation to the government in terms of Ways and Means Advances (WMA).
- Increase in net foreign currency assets– RBI buys forex in return of domestic currency.
- **Impact:** WACR>SDR-Weighted average call money rate (the operating target of the monetary policy) moving below the standing deposit facility rate (which is the floor in the LAF corridor to absorb liquidity).
- Normally the rate for short-run lending remains higher than the long run lending rate.
- **Operating Procedure of the Monetary Policy:** The operating procedure of monetary policy is guided by the objective of aligning the operating target of monetary policy – the WACR (weighted average call rate) – to the repo rate through active liquidity management, consistent with the stance of monetary policy.
- The MPC sets the flexible Inflation Targeting Framework in India. As enjoined by the Reserve Bank of India Act, the decision of the MPC on the policy rate has to be operationalised by the Reserve Bank of India so it alters the spending behaviour of the economic agents and, in turn,

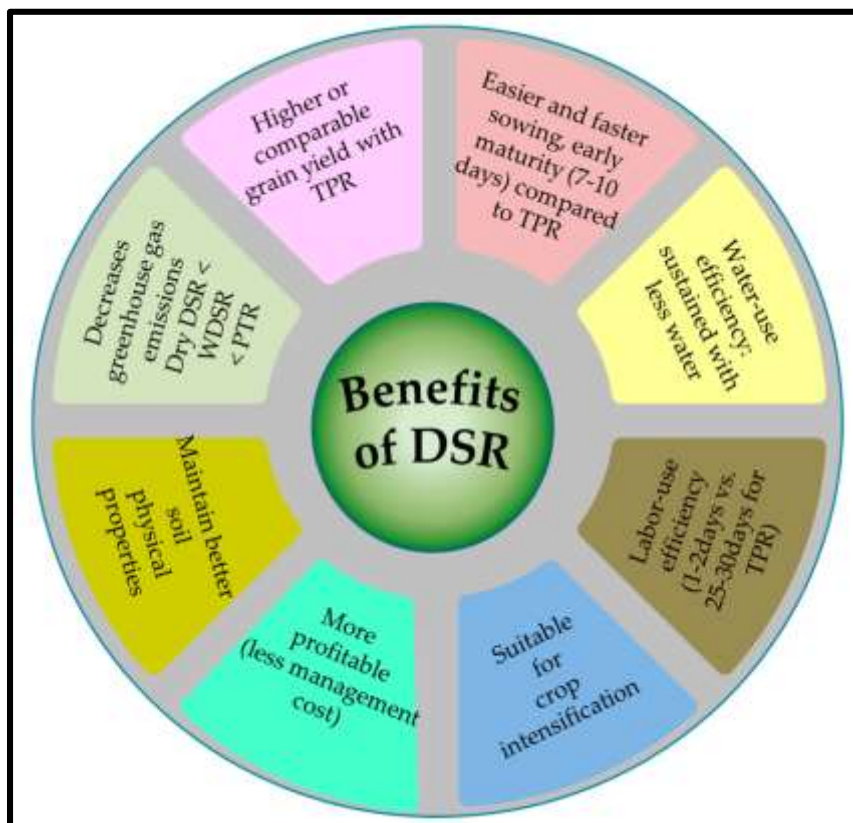
achieves the RBI's mandate on inflation and growth.

- Challenge for an efficient operating procedure: minimize the transmission lag from changes in the policy rate to the operating target – a variable that can be controlled by monetary policy actions – rapidly and efficiently; ensure that changes in the operating target are transmitted as fully as feasible across the interest rate term structure in the economy.
- **Procedure:** The weighted average call rate (WACR) – which represents the unsecured segment of the overnight money market and is best reflective of systemic liquidity mismatches at the margin – is explicitly chosen as the operating target of monetary policy in India.
- An interest rate corridor – the liquidity adjustment facility (LAF) – has been defined since May 2011 by the interest rate on the marginal standing facility (MSF) as the upper bound (ceiling), the fixed overnight reverse repo rate because the lower bound (floor) and also the policy repo rate in between.
- The framework aims at setting the policy repo rate based on an assessment of the current and evolving macroeconomic situation, and modulation of liquidity conditions to anchor money market rates at or around the repo rate.
- The LAF corridor effectively defines in the operating procedure of monetary policy.
- Once the policy repo rate is announced, liquidity operations are conducted to keep the WACR closely aligned to the repo rate.
- LAF corridor 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 which it drains excess liquidity from banks, marginal standing facility-rate at which RBI supplies liquidity on overnight basis (above the repo rate).

- It acted because the ceiling rate under the LAF corridor. Recently it introduced SDF which can currently act because the floor rate under the LAF corridor as being higher than the fixed reverse repo rate.
- **Standing Deposit Facility (SDF)** – The SDF has its origins in a 2018 amendment to the Reserve Bank of India Act and is an extra tool for absorbing liquidity without any collateral.
- It has replaced the fixed rate reverse repo (FRRR) as the floor of the LAF corridor.
- Thus, the LAF corridor are symmetric around the policy repo rate with the MSF rate because the ceiling and also the SDF rate because the floor with immediate effect.
- Access to SDF and MSF are at the discretion of banks, unlike repo/reverse repo, OMO and CRR that are available at the discretion of the reserve bank.
- Call money rate is the rate at which short term funds are borrowed and lent in the money market.
- The the call of the decision money loan is one day.
- Banks resort to these types of loans to fill the asset liability mismatch, comply with the statutory CRR and SLR requirements and to meet the sudden demand of funds.
- RBI, banks, primary dealers etc ar the participants of the call money market. Demand and provide of liquidity have an effect on the call money rate.
- A tight liquidity condition ends up in an increase in call money rate and vice versa

Topic 34. DIRECT SEEDING OF RICE (DSR)

Importance for Prelims: Agriculture



The Punjab government recently announced Rs 1,500 incentive per acre for farmers opting for Direct Seeding of Rice (DSR), that is known for saving water.

How much water is required to grow one kg rice?

- Paddy is non-shelled rice that farmers grow and sell in mandis so after milling paddy rice is prepared.

- According to the studies by Punjab Agriculture University (PAU), Ludhiana, around 3,600 litres to 4,125 litres of water is required to grow one kg rice depending upon the paddy variety.
- Long duration varieties consume more water.
- In Punjab, 32% of the area is under the long duration (around 158 days) paddy varieties, and the rest comes under paddy varieties that take upto 120 to 140 days to grow.

How much water can DSR help save?

- According to an analysis by the PAU, DSR technique can help save 15% to 20% water. In some cases, water saving will reach 22 percent to 23 percent.
- With DSR, 15-18 irrigation rounds are required against 25 to 27 irrigation rounds in traditional methods.

What is dsr technology?

- In DSR, the pre-germinated seeds are directly drilled into the field by a tractor powered machine.
- There is no nursery preparation or transplantation involved in this method.
- Farmers have to only level their land and give one pre-sowing irrigation.
- Traditional methods of rice transplantation
- In transplanting paddy, farmers prepare nurseries where the paddy seeds are first sown and raised into young plants.
- The nursery seed bed is 5-10% of the area to be transplanted.
- These seedlings are then uprooted and replanted 25-35 days later in the puddled field.
- **Benefits of DSR technology:** DSR (direct seeding of rice) does not require a puddling process as well as stagnant water in the field at least for three weeks after sowing.

- DSR can solve labour shortage problems because like the traditional method it does not require a paddy nursery and transplanting of 30 days old paddy nursery into the main puddled field.
- With the DSR, paddy seeds are sown directly with machine.
- DSR offers avenues for ground water recharge because it prevents the development of hard crust just below the plough layer because of puddled transplanting .
- It matures 7-10 days earlier than the puddle transplanted crop, therefore giving more time for management of paddy straw.
- Research trials and farmers' field surveys have indicated that yield yieldin DSR, are one to two quintals per acre more than puddled transplanted rice.

Topic 35. 'DIKTAT CALLING FOR STORAGE OF USER DATA MAY FACE BACKLASH'

Importance for Prelims: Science and Technology

‘The Ministry of electronics and information Technology’s (MeitY) new policy guidelines to virtual private network (VPN) service providers’.

- VPN is used to hide location as well as encrypt information being transferred between the senders to receiver.
- This might be the info of an enterprise sent over cloud network and storage, or 2 individuals exchanging files.
- **Current guidelines:** MeitY new directions to virtual private network (VPN) service providers to store data of Indian users for up to five years, may move to oppose the policy.
- The policy suggests that details, including user name, e-mail address, phone numbers, and IP addresses, among other data, need to be stored for at least five years.
- Data centre companies and cryptocurrency exchanges, too, need to collect and store user data by The Indian Computer Emergency Response Team (CERTIn), which works under MeitY.
- Additionally, VPN companies can have to regularly report the cases around the twenty cyber security vulnerabilities listed by CERT-In in its previous directions.

What is a VPN?

- A virtual private network, or VPN, is an encrypted connection over the Internet from a device to a network.
- The encrypted connection helps ensure that sensitive data is safely transmitted.
- It prevents unauthorized people from eavesdropping on the traffic and allows the user to conduct work remotely.
- VPN technology is the widely used in corporate environments.
- Because it is totally disconnected from the rest of the web, it's a secure system
- The network can be used safely by the government, companies, and military to utilise system resources.

How does a virtual private network (VPN) work?

- A VPN extends a corporate network through encrypted connections made over the Internet.
- Because the traffic is encrypted between the device and the network, traffic remains private as it travels.
- An employee can work outside the office and still securely connect to the corporate network.
- Even smartphones and tablets can connect through a VPN.

Is VPN traffic encrypted?

- Yes, traffic on the virtual network is sent securely by establishing an encrypted connection across the internet called a tunnel.
- VPN traffic from a device such as a computer, tablet, or smartphone is encrypted as it travels through this tunnel.
- Offsite employees can then use the virtual network to access the corporate network.
- Protocols of VPN to build stable networks, there are several distinct VPN

protocols are used.

- Some protocols of this kind are listed below IPsec (IP security) PPTP (Point to Point Tunneling Protocol) L2TP (Layer 2 Tunneling Protocol) SSL (Secure Sockets Layer) TLS (Transport Layer Security)

Topic 36. RUSSIA'S VICTORY DAY

Importance for Prelims: International relation

It is believed that President Vladimir Putin will use his May 9 speech to draw parallels between the conflict in Ukraine and the heroism of Soviet soldiers during World War II.

- About Russia's Victory Day On May 9, Russia commemorates the defeat of the Nazis during World War II.
- Notably, whereas the allies observe victory in Europe Day, on May 7, the day Nazis surrendered in France Soviet leader.
- Joseph Stalin chose to celebrate the fall of the Nazis in Soviet-controlled Berlin the next day.
- Whereas Russia's 1st post-Soviet president Boris Yeltsin made Victory Day celebrations an annual affair.
- It was Soviet leader Leonid Brezhnev who declared May 9 a national holiday.
- Victory Day celebrations usually include a massive military parade in Moscow.
- Russian leaders also traditionally stand on the tomb of revolutionary leader Vladimir Lenin in Red Square.

Topic 37. SECTION 11 OF THE ELECTRICITY ACT

Importance for Prelims: Economy

With the coal and power supply situation in the country becoming a cause of concern, the Power Ministry has read the riot act to the imported coal based (ICB) power plants directing them to start operations.

- Section 11 of the Electricity Act, allows the government to order a Genco, in extraordinary circumstances, to operate and maintain any generating station in accordance with the government's directions.
- India is that the third-largest producer and second-largest consumer of electricity worldwide, with an put in power capability of 395.07 GW, as of Jan 2022.
- India's power sector is one of the most diversified in the world sources of power generation range from the conventional sources such as coal, lignite, natural gas, oil, hydro and nuclear power to viable non-conventional sources such as wind, solar, and agricultural and domestic waste.
- India was ranked fourth in wind power, fifth in solar energy and fourth in renewable power installed capacity, as of 2020.
- India is that the only country among the G20 nations that's on track to realize the targets under the Paris Agreement.
- **Electricity regulation:** The Electricity Act 2003 governs the activities about generation, transmission, distribution, trading and use of electricity

in India.

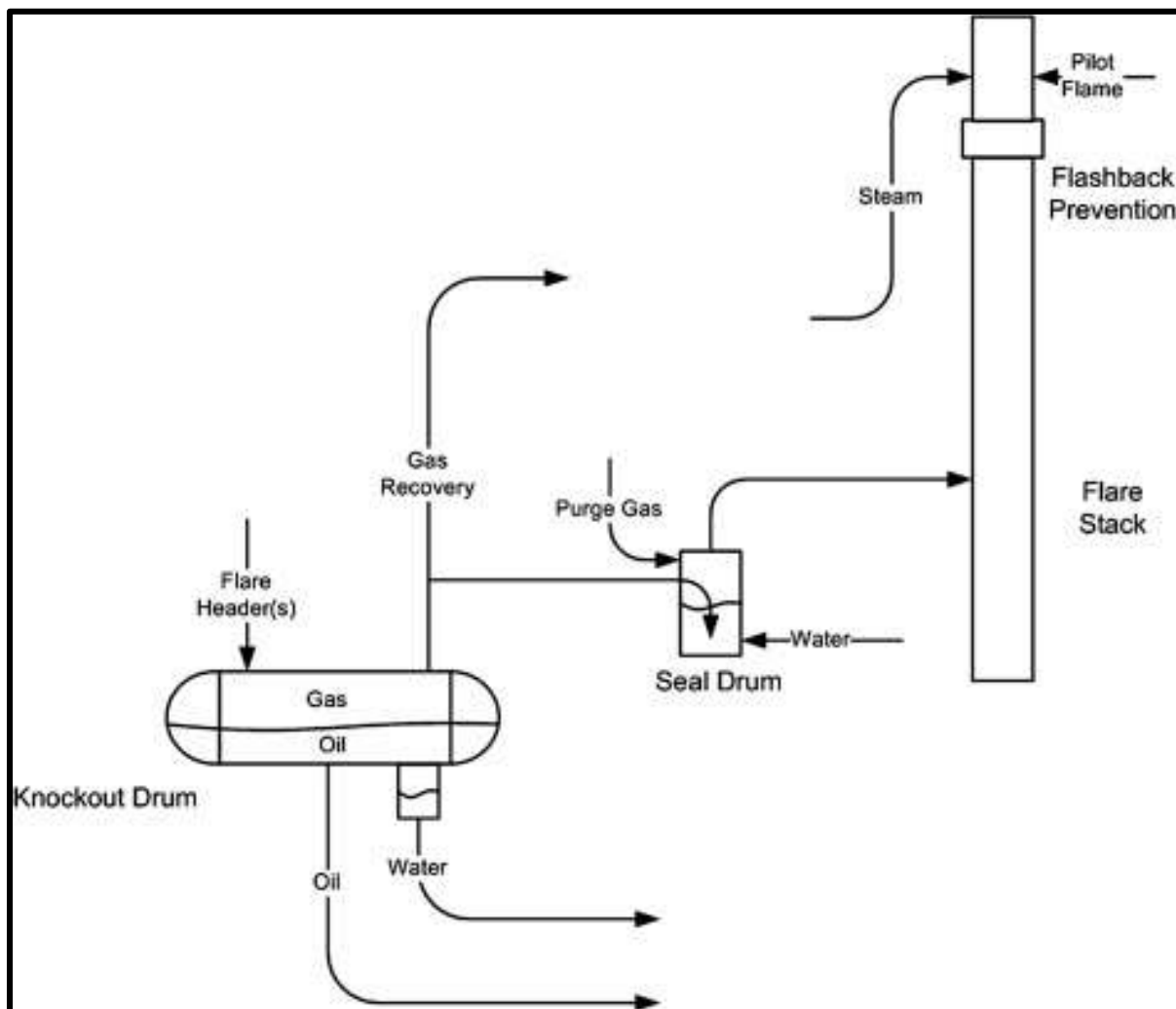
- The generation of electricity (except hydro) is an activity that does not require a licence.
- • Distribution, transmission and the trading of electricity are licensed activities under the Electricity Act.
- **The main objectives of the Electricity Act are:** Promoting competition. Protecting the interest of consumers.
- Ensuring electricity supply to all areas along with a rationalisation of tariffs.
- Ensuring transparent policies and promotion of efficiency.
- The Central Electricity Authority is the statutory body under the Electricity Act that advises the Government of India on establishing policies, safety requirements and technical standards.
- The Government of India (in consultation with the states and also the CEA) sets policies (such as the NTP and National Electricity Policy) as a guideline for the Central Electricity Regulatory Commission (CERC) and the State Electricity Regulatory Commissions (SERCs) when they make their regulations.
- The regulatory commissions are set up at the central and state level to regulate and oversee generation, distribution and transmission of electricity.
- They're independent bodies with functions as under below the Electricity Act.
- At the central level, CERC is responsible for the following: Regulating the tariffs of the generating companies that are owned or controlled by the Government of India.
- Regulating tariffs of generating companies (other than those owned or controlled by the Government of India), if these generating companies

enter into or otherwise have a composite scheme for generation and the sale of electricity in more than one state. Regulate inter-state transmission of electricity.

- Determine tariffs for inter-state transmission of electricity.
- Adjudicating the disputes involving generating companies or transmission licensees in relation to any of the previous matters.
- Issuing licences to transmission licensees and electricity traders.
- At the state level, the SERCs perform similar functions to those of CERC.
- **The functions of SERCs include the following:** Regulating the purchase and procurement of electricity by distribution licensees.
- Facilitating intra-state transmission of electricity and issuing licences to applicants for transmission licensees, distribution licensees and electricity traders within the state.
- Determining the tariffs for the generation, supply, transmission and wheeling of electricity (wholesale, bulk or retail) within the state.
- Adjudicate disputes between the licensees and/or the generating companies.
- Specify state grid codes consistent with the grid code specified by CERC.
- **There are four types of activities covered by the Electricity Act, that is: Three licensed activities:** transmission of electricity; trading of electricity (purchase of electricity for resale); and distribution of electricity.
- De-licensed activity-Generation activity except hydropower No licence is required under the Electricity Act for operating a generation plant (except hydro).
- However, a number of approvals, consents and permits must be obtained and maintained during the operation of the plant from various central and state bodies.

Topic 38. GAS FLARING AT OIL AND GAS FACILITIES AND GLOBAL WARMING

Importance for Prelims: Environment



Gas flared at the oil and gas facilities is greater than EU's total import from Russia and a key source of methane emission

What is gas flaring?

- Gas flaring is that the burning of natural gas associated with oil extraction.
- The practice has persisted from the beginning of oil production over one hundred sixty years ago and takes place because of a range of issues, from market and economic constraints, to a lack of appropriate regulation and political will.
- Flaring is a monumental waste of a valuable natural resource that should either be used for productive purposes, such as generating power, or conserved.
- For instance, the amount of gas that is currently flared each year – about 144 billion cubic meters – could power the whole of sub-Saharan Africa.
- **Impact of Gas flaring:** Gas flaring is turning out to be a major source of methane emission, a greenhouse gas (GHG) “over 80 times more powerful than carbon dioxide as a warming gas in the 20-year timeframe”.
- The World Bank’s latest 2022 Global Gas Flaring Tracker Report underscored that the efforts to curb this global warming causing activity have “stalled” in the last one decade.
- Reduction Partnership — “a multi-donor trust fund composed of govt, oil companies, and the multilateral organizations committed to the ending routine gas flaring at oil production sites across the world” — has been tracking gas flaring using satellite technology.
- According to the latest data released May 5,2022, the world in 2021 burnt 144 billion cubic metres (bcm) of gas at oil and gas facilities.
- It's estimated that this gas flaring resulted in approximately four hundred million tonnes of carbon dioxide (MMtCO₂e) equivalent emissions globally last year.
- Of this, 361 MMtCO₂e was in the form of co₂ and thirty-nine MMtCO₂e was in the form of methane.

- Gas flaring is considered both energy waste and global-warming activity.
- The flared gas in 2021 is more than the European Union's 27 member states' gas imports from Russia.
- To make sense of its energy potential, the wasted one hundred forty four bcm of natural gas would have generated one,800 terawatt hours of energy or nearly two-thirds of the european Union's net domestic electricity generation.
- Not only might the gas wasted displace dirtier fuels and increase energy access in some of the world's poorest countries, however by utilizing the gas that's currently being flared, the world may make significant progress towards a lot of needed energy security.
- Way forward Gas flaring is a direct source of methane. Methane has more warming potential than CO₂ but its atmospheric life is much less.
- Thus, its control can lead to fast reduction in emission of GHGs, thus controlling climate change.
- In 2015, countries and companies committed to end flaring by 2030 underneath the world Bank-initiated Zero Routine Flaring initiative.
- The latest assessment shows that efforts are matching the commitment made.
- "Global gas flaring volumes have the remained largely static over the last ten years, plateauing at around one hundred forty four bcm."

Topic 39. NFHS 5

Importance for Prelims: Governance

The NFHS-5 national report lists progress from NFHS-4 (2015-16) to NFHS-5 (2019-21). The report also provides information by socio-economic and other background characteristics; useful for policy formulation and effective programme implementation.

- The Total Fertility Rate (TFR), an average number of children per woman, has further declined from 2.2 to 2.0 at the national level between National Family Health Survey (NFHS) 4 and 5.
- There are only 5 States — Bihar (2.98), Meghalaya (2.91), Uttar Pradesh (2.35), Jharkhand (2.26) Manipur (2.17) — in India that are higher than replacement level of fertility of 2.1 as per the national report of NFHS 5.
- Institutional births increased from 79% to 89% across India and in rural areas around 87% births being delivered in institutions and the same is 94% in urban areas.
- As per results of the NFHS-5, over the three fourths (77%) children aged between twelve and twenty three months were fully immunised, compared with sixty two in NFHS4.
- The level of stunting among children under 5 years has marginally declined from thirty eighth to twelve months in the country since the last

four years.

- Stunting is higher among children in rural areas (37%) than urban areas (30%) in 2019-21.
- NFHS-5 shows an overall improvement in Sustainable Development Goals indicators in all States/Union Territories (UTs).
- The extent to which married women usually participate in 3 household decisions (about health care for herself; making major household purchases; visit to her family or relatives) indicates that their participation in decision-making is high, ranging from 80% in Ladakh to 99% in Nagaland and Mizoram.
- Rural (77%) and urban (81%) differences are found to be marginal. The prevalence of women having a bank or savings account has increased from 53% to 79% in the last four years.
- Compared with NFHS-4, the prevalence of overweight or obesity has increased in most States/UTs in NFHS-5.
- At the national level, it increased from 21% to 24% among women and 19% to 23% among men.
- More than a third of women in Kerala, Andaman and Nicobar Islands, Andhra Pradesh, Goa, Sikkim, Manipur, Delhi, Tamil Nadu, Puducherry, Punjab, Chandigarh and Lakshadweep (34-46 %) are overweight or obese.
- NFHS The National Family Health Survey (NFHS) may be a large-scale, and the multi-round survey conducted in a representative sample of households throughout India.
- All National Family Health Surveys are conducted under the stewardship of the Ministry of Health and Family Welfare, Government of India, with the International Institute for Population Sciences,, Mumbai, serving as the nodal agency.

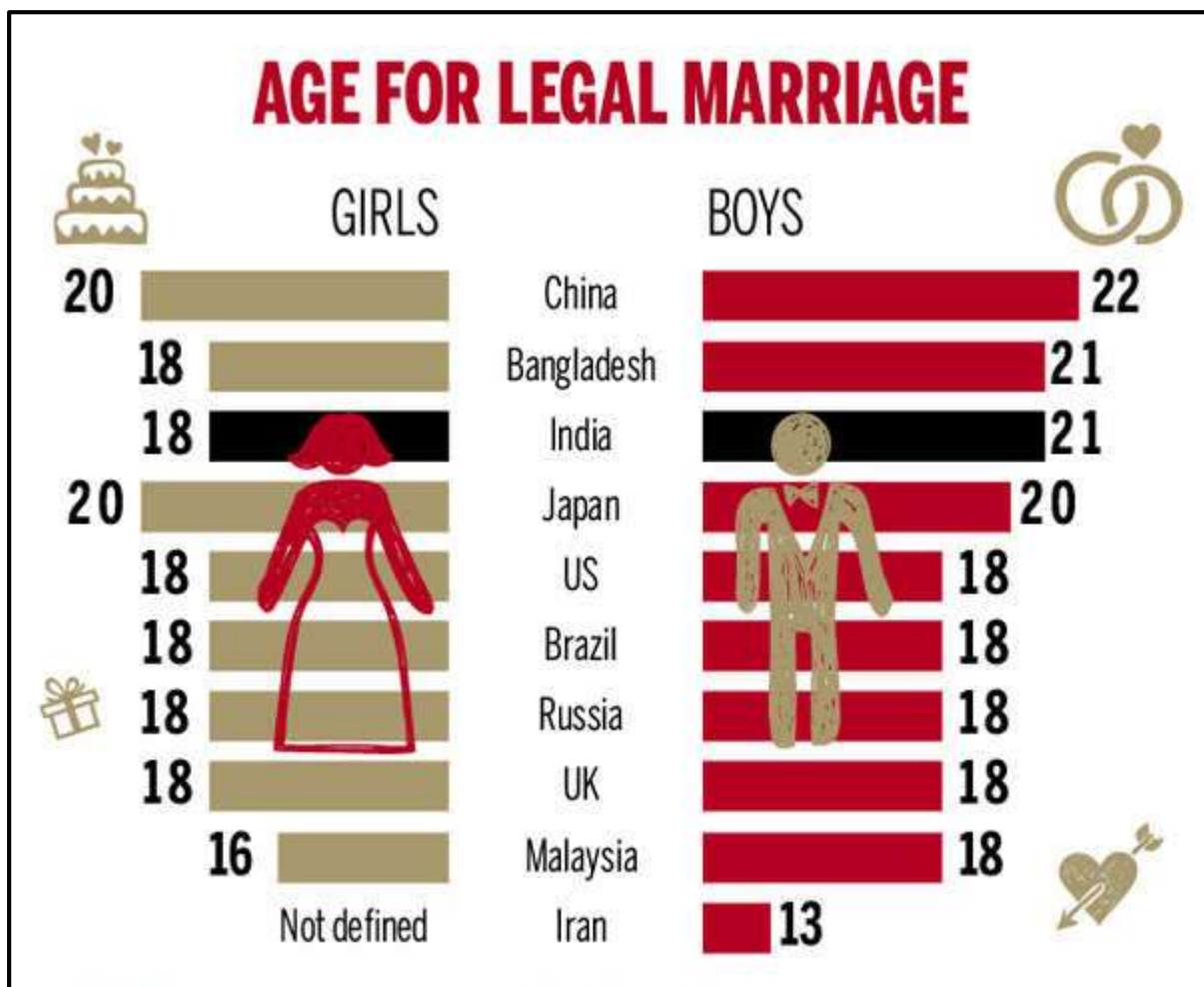
- ICF International (formerly Macro International), Maryland, USA, provided technical assistance for all four surveys conducted as on date National Family Health Survey (NFHS) Year NFHS-1 1992-93 NFHS-2 1998-99 NFHS-3 2005-06 NFHS-4 2014-15 NFHS-5 2019-21 the survey provides state and national information for India on fertility, infant and child mortality, the practice of family planning, maternal and child health, reproductive health, nutrition, anaemia, utilization and quality of health and family planning services.

Each successive round of the NFHS has had two specific goals:

- a) provide essential information on health and family welfare needed by the Ministry of Health and Family Welfare and different agencies for policy and programme purposes, and to provide information on important emerging health and family welfare issues.

Topic 40. LEGAL AGE FOR MARRIAGE

Importance for Prelims: Governance



About twenty five per cent of women aged 18-29 and fifteen per cent of men aged 21-29 got married before reaching the minimum legal age of marriage, according to the latest National Family Health Survey (NFHS) conducted between 2019-21.

- In India, the legal age of marriage for women is 18 and 21 for men. However, the govt is planning to make it twenty one for both men and women.
- The NFHS-5 aforesaid regarding two-fifths of women married before reaching the legal age in west bengal (42 per cent), Bihar (40 per cent), and Tripura (39 per cent), and regarding one-third of them tied the knot before reaching the legal age of marriage in Jharkhand (35 per cent) and Andhra Pradesh (33 per cent).
- The percentage of women marrying before reaching the legal minimum age of 18 is lowest in Lakshadweep (4 per cent); Jammu and Kashmir, and Ladakh (6 per cent each); Himachal Pradesh, Goa, and Nagaland (7 per cent each), and Kerala and Puducherry (8 per cent each).
- But the report also said that early marriage has been declining over time. Marriage before the legal age of eighteen is twenty three per cent for women age 20-24, compared with forty seven per cent for women age 45-49.
- Equally, for men, marriage before the legal age of twenty one years has dropped from twenty seven per cent for men aged 45-49 to eighteen per cent for men aged 25-29.
- The median age at first marriage for women aged 20-49 slightly increased from 19 years in 2015-16 to 19.2 years in 2019-21.
- For men aged 25-49, the median age at first increased slightly exaggerated between 2015-16 and 2019-21 (from 24.5 to 24.9 years), the NFHS said. it had been also noted that women having twelve or a lot of years of schooling marry a lot of later than other women.
- The median age at first marriage for women aged 25-49 will increase from 17.1 years for women with no schooling to 22.8 years for women with twelve or more years of schooling.

