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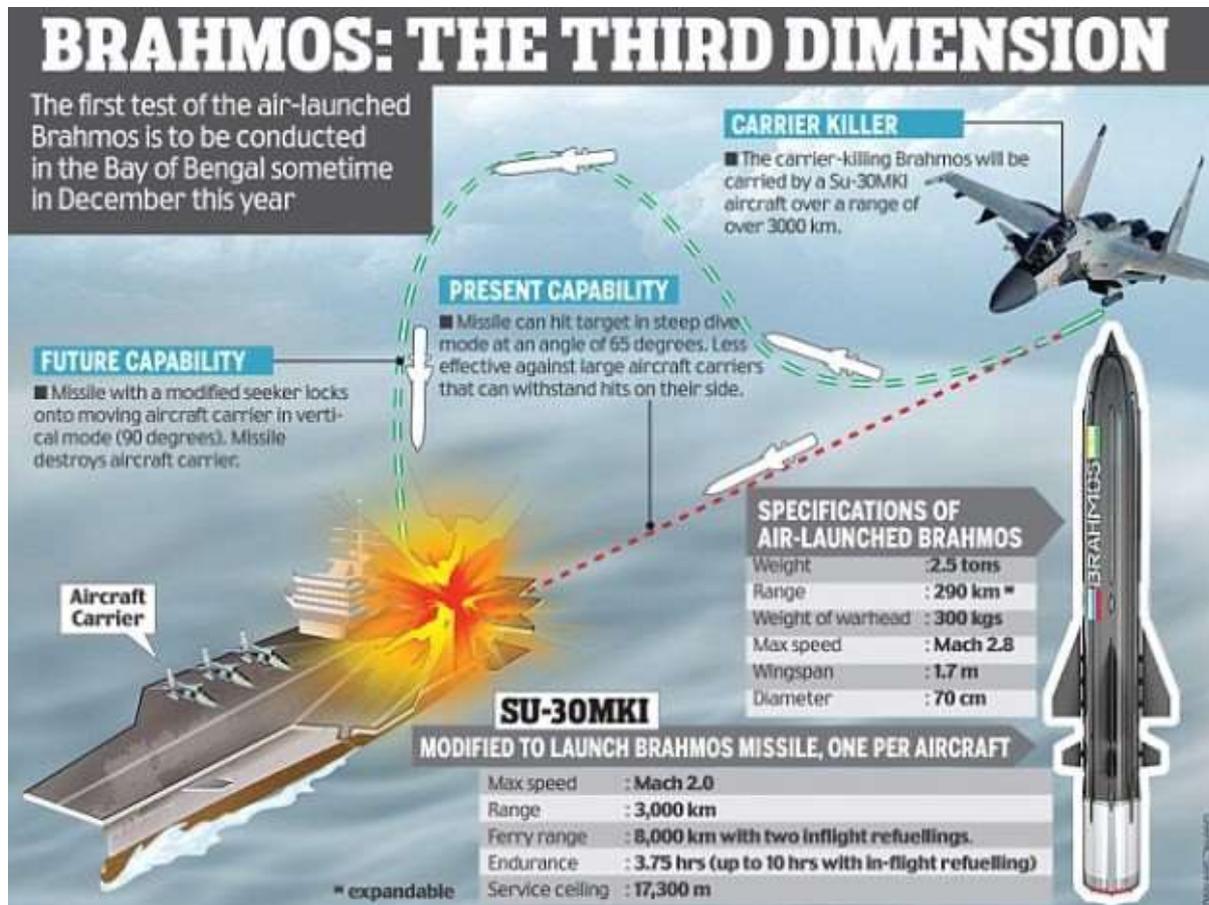
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Success is born of action...

Topic 1: Brahmos

Importance for Prelims: Science and tech



BrahMos surface-to-surface supersonic cruise missile was successfully flight tested for designated range in Odisha

- BrahMos is a **cruise missile**, meaning it can be **guided towards a predetermined land- or sea-based target**.
- With a capability to attain speeds 2.8 times that of sound (Mach 2.8), **BrahMos is classified as supersonic cruise missile**.
- An amalgam of the names of the rivers Brahmaputra and Moskva, BrahMos is being produced by BrahMos Aerospace, a joint venture company set up by DRDO and Mashinostroyeniya

of Russia in 1998.

- The first version of the BrahMos supersonic cruise missile was inducted into the Indian Navy in 2005, meant to be fired from INS Rajput.
- The missile is **capable of being launched from land, sea, sub-sea and air** against surface and sea-based targets.
- Its range was **initially capped at 290 km** as per obligations of the Missile Technology Control Regime (MTCR).
- But since India's entry into the club, the range **has been extended to 450 km, and the plan is to increase it to 600km.**

Topic 2: Decarbonization and Energy Transition Agenda

Importance for Prelims: IR



NITI Aayog and Embassy of the Netherlands signed a Statement of Intent (SoI) to support the decarbonization and energy transition agenda for accommodating cleaner and more energy.

- The focus of the partnership is on **co-creating innovative technological solutions** by leveraging the expertise of the two entities.
- This will be achieved through an exchange of knowledge and collaborative activities.
- Key elements include i) **lowering the net carbon footprint** in industrial and transport sectors ii) **realise the target potential of natural gas** and promote bio-energy technologies iii) **adopt clean air technologies** from monitoring to reducing actual

particulates iv) adopt next-generation technologies, such as hydrogen, carbon capture utilization, and storage for sectoral energy efficiency v) financial frameworks to deliver and adopt climate change finance.

- Through this collaboration, NITI Aayog and the Dutch Embassy seek a strategic partnership to create a platform that enables a comprehensive collaboration among stakeholders and influencers, including policymakers, industry bodies, OEMs, private enterprises, and sector experts.

Topic 3: Ambedkar Social Innovation & Incubation Mission (ASIIM)

Importance for Prelims: Government initiative



Union Minister for Social Justice and Empowerment e-launched the **Ambedkar Social Innovation and Incubation Mission (ASIIM)** under Venture Capital Fund for SCs through Video Conferencing

- Ministry of Social Justice had **launched the Venture Capital Fund for SCs (VCF-SC) in 2014-15** with a view to **developing entrepreneurship amongst the SC/Divyang youth** and to enable them to become ‘job-givers’.
- The Objective of this fund is to provide **concessional finance to the entities of the SC entrepreneurs.**

Objectives

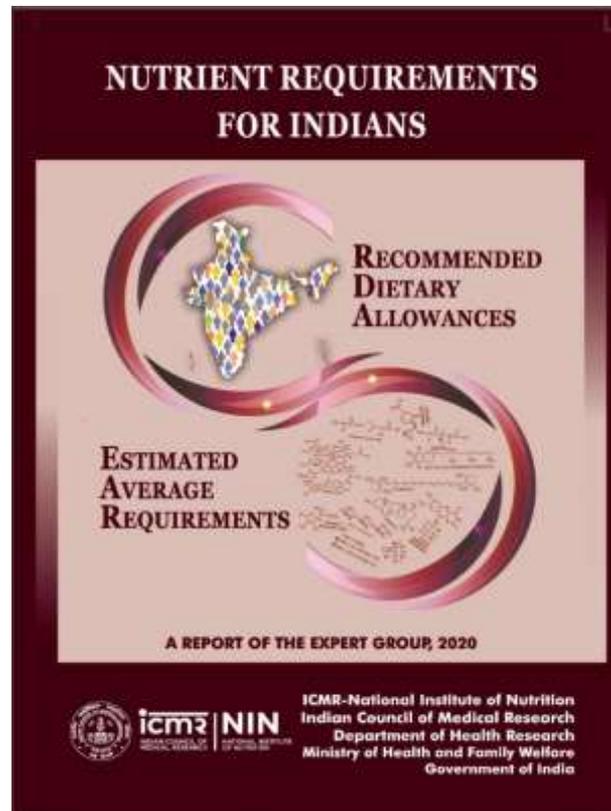
- To promote entrepreneurship among the SC Youth with special preference to Divyangs;
- To support (1,000) innovative ideas till 2024 through a synergetic work with the Technology Business Incubators (TBIs) set up by Department of Science and Technology;
- To support, promote, hand-hold the start-up ideas till they reach commercial stage by providing liberal equity support; and
- To incentivise students with innovative mind-set to take to entrepreneurship with confidence.

Benefits

- Under the “Ambedkar Social Innovation Incubation Mission (ASIIM)” initiative, **1,000 SC youth would be identified in the next 4 years with start-up ideas through the Technology Business Incubators (TBIs) in various higher educational institutions.**
- They will be funded @ Rs. 30 lakhs in 3 years as equity funding so that they can translate their start-up ideas into commercial ventures.
- Successful ventures would further qualify for venture funding of up to Rs. 5 Crore from the Venture Capital Fund for SCs.

Topic 4: Recommended Dietary Allowances’ and ‘Nutrient Requirements’ report

Importance for Prelims: Report



A special report ‘Nutrient Requirements for Indians’ and ‘What India Eats’, prepared by Hyderabad-based National Institute of Nutrition (NIN) was launched

- This is for the **first time that the NIN report on nutrient requirements for Indians** includes the **Estimated Average Requirements (EAR)** and also the **Tolerable Upper Limits (TUL)** of nutrients alongside the **Recommended Dietary Allowances (RDAs)** for individuals in the Country.
- The ideal weight of an Indian man is now 65 kg and for a

woman it is 55 kg, according to a report released by the National Institute of Nutrition (NIN).

- It forms the **basis for defining the nutrient levels in policies and programmes** of the Centre.
- The report gives details of ‘Regional Dietary Pattern of Indian Population’ and energy and protein sources from different food groups in graphical form.
- The RDAs are **very important for many national level health and welfare programmes**. With the new additions like EARs and Tolerable Upper Limits, these are not only useful in evaluating the nutritional status of populations or groups but also **in defining the regulation on food fortification and supplementation of nutrients**
- The **NIN has been the nodal agency for recommending the dietary allowances and nutrient requirements for Indians**.
- The RDAs are revisited and revised from time to time in view of the changing food habits, physical activity patterns, nutrition transition and health status of various groups.
- Recommended Dietary Allowances (RDAs) are the **levels of intake of essential nutrients that, on the basis of scientific knowledge, are judged by the Food and Nutrition Board to be adequate** to meet the known nutrient needs of practically all healthy persons.

Topic 5: EPCA

Importance for Prelims: Environment



EPCA opposes paying farmers for not burning paddy stubble

- The EPCA was constituted in 1988 under the **provisions of the Environment (Protection) Act, 1986.**
- The Centre has **reconstituted the Supreme Court-empowered Environment Pollution (Prevention and Control) Authority** or the EPCA in 2018.
- Its mandate is to protect and improve the quality of the environment and prevent and control environmental pollution in the NCR.
- It is also **mandated to enforce Graded Response Action Plan (GRAP) in NCR** that defines specific measures to tackle different levels of air pollution throughout the year.
- It has 14 members including environment secretary of the National Capital Territory of Delhi (NCT).

Topic 6: Armenia VS Azerbaijan

Importance for Prelims: IR



Over the last one week, **military action in Nagorno-Karabakh, a region disputed between Armenia and Azerbaijan**, has resulted in the death of at least 100 civilians and Armenian combatants.

- Straddling western Asia and Eastern Europe, **Nagorno-Karabakh is internationally recognised as part of Azerbaijan**, but most of the region is **controlled by Armenian separatists**.
- Nagorno-Karabakh has been part of Azerbaijan territory since the Soviet era.
- When the Soviet Union began to collapse in the late 1980s, **Armenia's regional parliament voted for the region's transfer to Armenia; the Soviet authorities turned down the demand**.

- Years of clashes followed between Azerbaijan forces and Armenian separatists.
- The violence lasted into the 1990s, leaving tens and thousands dead and displacing hundreds of thousands.
- **In 1994, Russia brokered a ceasefire, by which time ethnic Armenians had taken control of the region.**
- While the area remains in Azerbaijan, it is today governed by separatist Armenians who have declared it a republic called the “Nagorno-Karabakh Autonomous Oblast”. While the Armenian government does not recognise
- Nagorno-Karabakh as independent, it supports the region politically and militarily.
- Even after the 1994 peace deal, the region has been marked by regular exchanges of fire.
- In 2016, it saw a Four-Day War before Russia mediated peace.

Topic 7: Free speech

Importance for Prelims: Polity



The Bombay High Court said that in a democracy **citizens are free to express their views**, but they have to ensure that while exercising their right they **don't violate someone else's constitutional rights**.

- **Article 19 in the Indian constitution gives us the freedom of speech and expression** with some **reasonable restrictions** under as follows:
- It should **not affect the security of the State, friendly relations with foreign States, public order, decency or morality**, or in **relation to contempt of court, defamation or incitement to an offense.**

Topic 8: Kisan rail

Importance for Prelims: Schemes



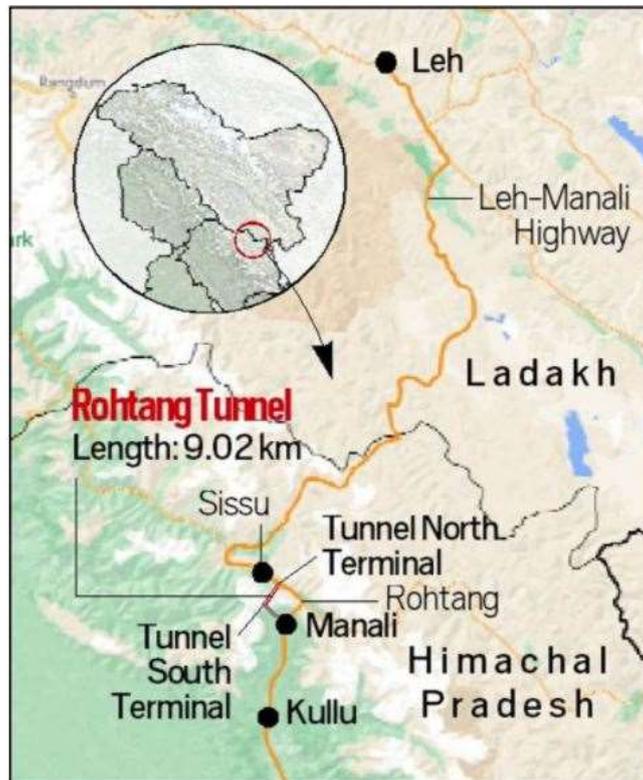
Kisan Rail started to function

- Mango special, Banana Special, Onion Special, Sapota Special are some of the routes of Kisan Rail These **special seasonal trains identified by the government for farmers to send fresh fruits, vegetables and other perishable goods** to buyers across India.
- Rail and Agriculture ministries are working to institutionalise these “corridors”, or dedicated routes, to make them season-specific to a fruit or vegetable. The plans also include carrying fish and meat in refrigerated containers at some point in the future.

- Kisan Rail shall be **trains with multi commodities, multi-consignors and multi consignees**. These trains shall run between fixed Origin–Destination pairs with en-route stoppages, and loading/ unloading shall be permitted at any of the en-route stoppage.
- The Origin–Destination pairs, routes, stoppages, and frequency of the train shall **be decided jointly by the Ministry of Agriculture & Farmers’ Welfare and Ministry of Railways.**

Topic 9: Atal tunnel

Importance for Prelims: Geography

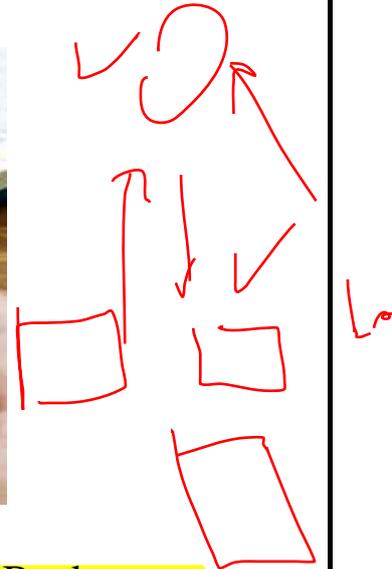


Prime Minister will inaugurate the **strategically important Atal Tunnel in Himachal Pradesh.**

- The 9.02-km tunnel, **the longest highway tunnel in the world above the height of 3,000 metres** cuts through a mountain west of the Rohtang La.
- It will shorten the distance between Solang Valley and Sissu by around 46 km and will take around 15 minutes to cover. Earlier, it would take nearly 4 hours to travel between the two points.
- The **double-laned tunnel** — **one of the longest road tunnels in the country** — can handle around 3,000 cars and 1,500 trucks per day, with a maximum speed of 80 km per hour.

Topic 10: IBBI

Importance for Prelims: Economy



The Corporate Affairs Ministry and the **Insolvency and Bankruptcy Board of India (IBBI)** have written to the Reserve Bank of India (RBI), asking the central bank to permit Asset Reconstruction Companies (ARCs) to bid for stressed assets under the Insolvency And Bankruptcy Code (IBC).

- Under current regulations, **Asset Reconstruction Companies (ARCs) are not allowed to bid for equity** in stressed companies directly, though they can **acquire equity through conversion of debt into equity**.
- Allowing ARCs to participate would improve the probability of distressed companies receiving resolution plans.

IBBI

- The Insolvency and Bankruptcy Board of India was established on 1st October, 2016 **under the Insolvency and Bankruptcy Code, 2016**.

- It is a **key pillar of the ecosystem responsible for implementation of the Code** that consolidates and amends the laws relating to **reorganization and insolvency resolution of corporate persons, partnership firms and individuals** in a time bound manner for maximization of the value of assets of such persons, to promote entrepreneurship, availability of credit and balance the interests of all the stakeholders.
- It is a **unique regulator: regulates a profession as well as processes.**
- It has regulatory **oversight over the Insolvency Professionals, Insolvency Professional Agencies, Insolvency Professional Entities and Information Utilities.**
- It writes and enforces rules for processes, namely, corporate insolvency resolution, corporate liquidation, individual insolvency resolution and individual bankruptcy under the Code.

Topic 11: Indian-Germany bubble

Importance for Prelims: IR

MISSION VANDI BHARAT

**Air Transport Bubble
Germany ⇌ India**

Who Can Travel?

- Germany to India -

- Stranded Indian nationals;
- Foreigners (including diplomats and OCI card holders), who are eligible to enter India as per Ministry of Home Affairs (MHA) guidelines dated 30.06.2020 as amended from time to time.

AIR INDIA
A STAR ALLIANCE MEMBER

India's air transport bubble with Germany has been suspended after the European country prohibited national carrier Air India from flying to its airports

- Air bubbles refer to **bilateral agreements India has struck or is in the process of finalising with specific countries** to allow their national carriers to ferry passengers back and forth from India

Topic 12: Immunization program

Importance for Prelims: Schemes



India had “broken its inertia” in vaccine development after 2014 and had introduced four new vaccines into the country’s immunization programme.

- **Immunization Programme in India was introduced in 1978** as ‘**Expanded Programme of Immunization**’ (EPI) by the Ministry of Health and Family Welfare, Government of India.
- In 1985, the programme was modified as ‘ **Universal Immunization Programme**’ (UIP) to be implemented in phased manner to cover all districts in the country by 1989-90 with the one of largest health programme in the world.
- **Ministry of Health and Family Welfare** provides several vaccines to **infants, children and pregnant women** through the Universal Immunisation Programme.
- Through UIP, Government of India is providing **vaccination**

free of cost against vaccine preventable diseases include **diphtheria, pertussis, tetanus, polio, measles**, severe form of childhood tuberculosis, hepatitis B, meningitis and pneumonia (Hemophilus influenza type B infections), **Japanese encephalitis (JE) in JE endemic districts** with introduction of newer vaccines such as rotavirus vaccine, IPV, adult JE vaccine, pneumococcal conjugate vaccine (PCV) and measles-rubella (MR) vaccine in UIP/national immunization programme.

Mission Indradhanush

- **Mission Indradhanush was launched in 2014** to strengthen and re-energize the programme and achieve **full immunization coverage for all children and pregnant women** at a rapid pace.

Intensified Mission Indradhanush

- To further intensify the immunization programme Intensified Mission Indradhanush (IMI) was launched on 2017. Through this programme, Government of India aims to reach each and every child up to two years of age and all those pregnant women **who have been left uncovered under the routine immunisation programme/UIP.**
- The focus of special drive was to improve immunisation coverage in select districts and cities to ensure full immunisation to more than **90%** by December 2018.

Topic 13: Green fireworks

Importance for Prelims: Environment

WHAT ARE 'GREEN CRACKERS'?

Firecrackers that have "less dangerous" and "less harmful" chemicals than conventional ones

Green Because

- ▶ They have a chemical formulation that produces water molecules
- ▶ This substantially reduces emission level and absorbs dust
- ▶ Is basically a light and sound show that produces lower emissions
- ▶ Promise **30-35% reduction** in particulate matter, nitrous oxide and sulphur oxide

Being Developed by
CSIR's National Environmental Engineering Research Institute

Production after they are approved by Petroleum and Explosives Safety Organisation (PESO)

Also In The Works
E-CRACKERS BEING DEVELOPED BY CSIR'S CENTRAL ELECTRONICS ENGINEERING RESEARCH INSTITUTE

Expected to hit the market in 4-5 years*

OTHER INITIATIVES

- Crackers with lower aluminium to reduce emissions substantially
- 'Anar' or flower pot made using eco-friendly material that can reduce particulate matter by 40%
- Bijli crackers that eliminate use of ash as desiccants
- Firecrackers without antimony, lithium, mercury, arsenic and lead as directed by PESO last year

Council of Scientific and Industrial Research

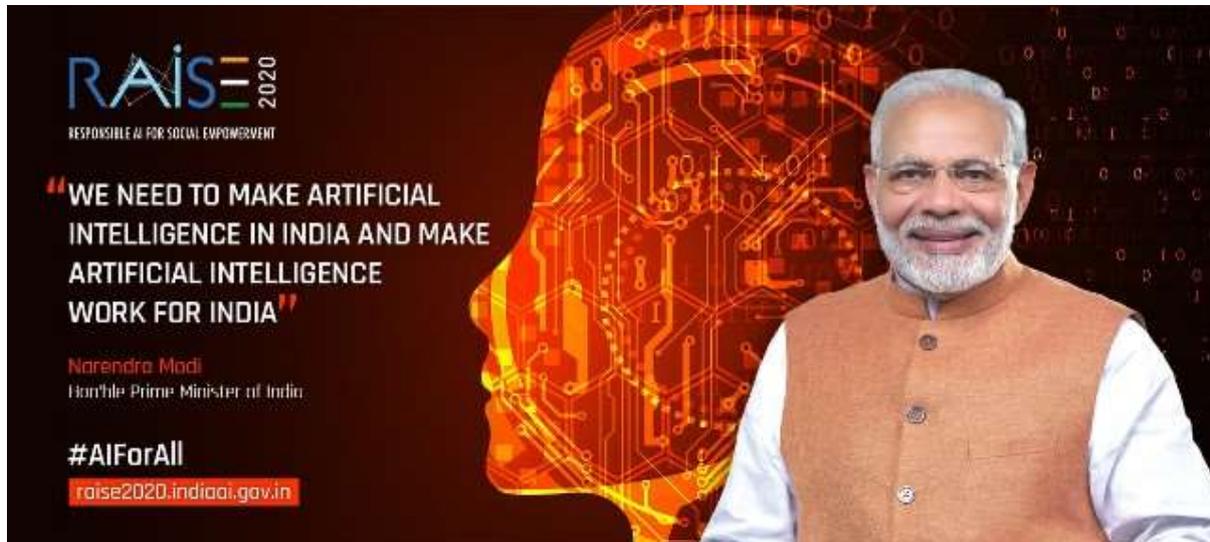
Manufacturers in Sivakasi – the country's fireworks manufacturing capital – have produced environmentally friendly fireworks as per

Supreme Court order on 'green' crackers.

- Traditionally, **firecrackers have been made with barium nitrate, antimony and a range of metals** that, over the years, have been linked to respiratory diseases and even cancer.
- Green crackers are those **crackers which do not contain harmful chemicals that would cause air pollution.**
- They are **environmentally friendly and less harmful as compared to conventional firecrackers** and less pollution emission will result in reduced air pollution.
- In it commonly used polluting chemicals like aluminium, barium, potassium nitrate and carbon have either been removed or sharply reduced to slow down the emissions by 15 to ~~30%~~.
- **CSIR scientists have developed Less Polluting Firecrackers which are not only environment friendly but 15-20 % cheaper than the conventional ones**
- These crackers have been named as safe water releaser (SWAS), safe minimal aluminium (SAFAL) and safe thermite cracker (STAR).

Topic 14: RAISE

Importance for Prelims: Government initiative



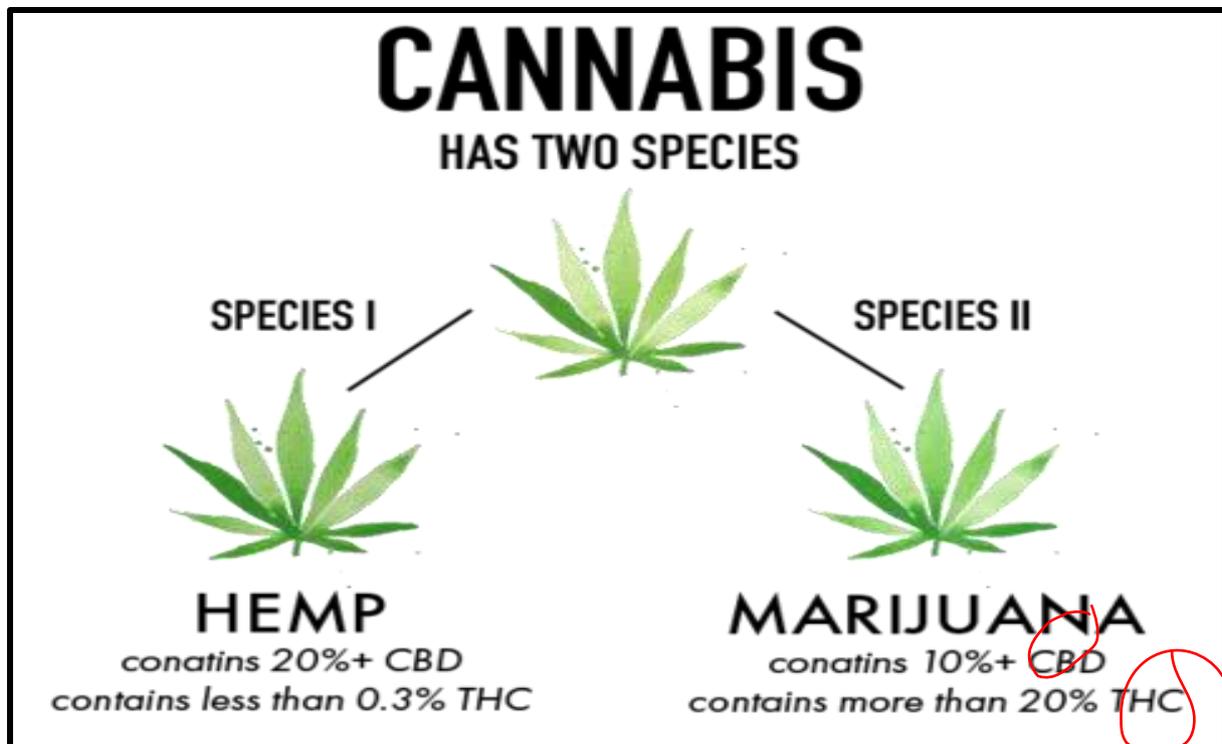
Prime Minister inaugurates RAISE 2020- '**Responsible AI for Social Empowerment 2020**,' a Mega Virtual Summit on Artificial Intelligence (AI)

- The Ministry of Electronics and Information Technology (MeitY) and NITI Aayog are organising the Mega Virtual Summit AI.
- RAISE 2020 will be a **global meeting of minds to exchange ideas and chart a course for using AI for social transformation, inclusion and empowerment** in areas like Healthcare, Agriculture, Education and Smart Mobility, among other sectors.
- At the RAISE 2020, delegates and experts in research, policy and innovation on Artificial Intelligence will join from across the globe.

- The summit will discuss cross-sector subjects like ‘Leveraging AI for Pandemic Preparedness’, ‘The Impetus that Innovation Places on Digitisation’, ‘Inclusive AI’, ‘Partnerships for Successful Innovation’ etc.

Topic 15: CBD oil

Importance for Prelims: Science and tech



Earlier this week, there was an appeal to legalise CBD oil in India

- CBD oil is an **extract from the cannabis plant**.
- The two main active substances in it are **cannabidiol or CBD and delta-9 tetrahydrocannabinol, or THC**.
- The high that is caused by the consumption of cannabis is due to THC. CBD, however, does not cause a “high” or any form of intoxication.
- CBD oil is made by extracting CBD from the cannabis plant, then diluting it with a carrier oil like coconut or hemp seed oil.
- **Cannabidiol has effects on the brain**, preventing the breakdown of a chemical that aggravates pain and **affects mood**,

and mental function.

- It can **reduce pain and anxiety**. It also reduces psychotic symptoms associated with conditions such as schizophrenia as well as epilepsy.
- The **Narcotic Drugs and Psychotropic Substances Act, 1985 (NDPS Act) outlaws the recreational use of cannabis.**
- The NDPS Act, however, does not apply to the leaves and seeds of cannabis plants.
- In case the CBD is extracted from the leaves of the cannabis, then technically it is not illegal.
- **CBD oil manufactured under a licence issued by the Drugs and Cosmetics Act, 1940 can be legally used.** However, the use of cannabis as a medicine is not much prevalent in India.
- The recent controversy about the use of drugs in Bollywood has further stigmatised the usage of CBD.

Topic 16: Madhuca diplostemon and sacred grove

Importance for Prelims: Environment



A tree species, long believed extinct, has been rediscovered after a gap of more than 180 years from a sacred grove in Kollam district.

- Madhuca diplostemon, a **species of flowering plant** from Sapotaceae family, has been listed as **endangered** by the International Union for Conservation of Nature (IUCN) Red List of Threatened Species.
- It is believed that the species was a **highly local endemic with a few individuals in the past, which were inadvertently removed for temple expansion** in recent years.
- This species was **first described by Robert Wight, a surgeon-botanist of the East India Company, based on his collection from Kollam in 1835** which comprises three specimens with immature flower buds.
- Since its original collection, individuals of Madhucadiplostemon

were never collected again, neither from its locality nor elsewhere, and botanical explorations in Eastern and Western Ghats have failed to find the species.

- Moreover, it has not been enlisted in any of the recent treatises of southern India.
- The present collection hence forms a **rediscovery of this species after a hiatus of 184 years since its first collection**
- The institute is now **planning to undertake off-site conservation** activities for this species through its species recovery programme.

Sacred groves

- They comprise of **patches of forests or natural vegetation** – from a few trees to forests of several acres – that are **usually dedicated to local folk deities** (Example – Ayyanar and Amman) or tree spirits (Vanadevatais).
- These spaces are **protected by local communities** because of **their religious beliefs and traditional rituals** that run through several generations.
- The degree of sanctity of the sacred forests varies from one grove to another. In some forests even the dry foliage and fallen fruits are not touched. People believe that any kind of disturbance will offend the local deity, causing diseases, natural calamities or failure of crops. For example, the Garo and the Khasi tribes of northeastern India completely prohibit any

human interference in the sacred groves.

- In other groves, deadwood or dried leaves may be picked up, but the live tree or its branches are never cut. For example, the Gonds of central India prohibit the cutting of a tree but allow fallen parts to be used.

Classification of sacred groves

- **Traditional Sacred Groves** – It is the place where the village deity resides, who is represented by an elementary symbol
- **Temple Groves** – Here a grove is created around a temple and conserved.
- **Groves around the burial or cremation grounds**

Ecological significance

- **Conservation of Biodiversity**– The sacred groves are important repositories of floral and faunal diversity that have been conserved by local communities in a sustainable manner. They are often the last refuge of endemic species in the geographical region.
- **Recharge of aquifers**– The groves are often associated with ponds, streams or springs, which help meet the water requirements of the local people. The vegetative cover also helps in the recharging the aquifers.
- **Soil conservation**– The vegetation cover of the sacred groves improves the soil stability of the area and also prevents soil erosion.

- In India, sacred groves are **found all over the country and abundantly along the western ghats in the states of Kerala and Karnataka.** Although, there has been no comprehensive study on the sacred groves of the entire country, experts estimate the total number of sacred groves in India could be in the range of 100,000 – 150,000.

Topic 17: Ex Bongosagar

Importance for Prelims: IR



The second edition of the bilateral naval exercise between India and Bangladesh “Exercise Bongosagar” began in the northern Bay of Bengal

- Ex Bongosagar, whose **first edition was held in 2019**, is aimed at **developing inter-operability and joint operational skills** through conduct of a wide spectrum of maritime exercises and operations
- In this edition of Ex Bongosagar, ships from both navies will participate in surface warfare drills, seamanship evolutions and helicopter operations

Topic 18: LEMOA

Importance for Prelims: IR



A U.S. Navy P-8A long range Maritime Patrol Aircraft (MPA) landed at Port Blair in the Andaman and Nicobar Islands in the last week of September for refuelling under the bilateral logistics support agreement

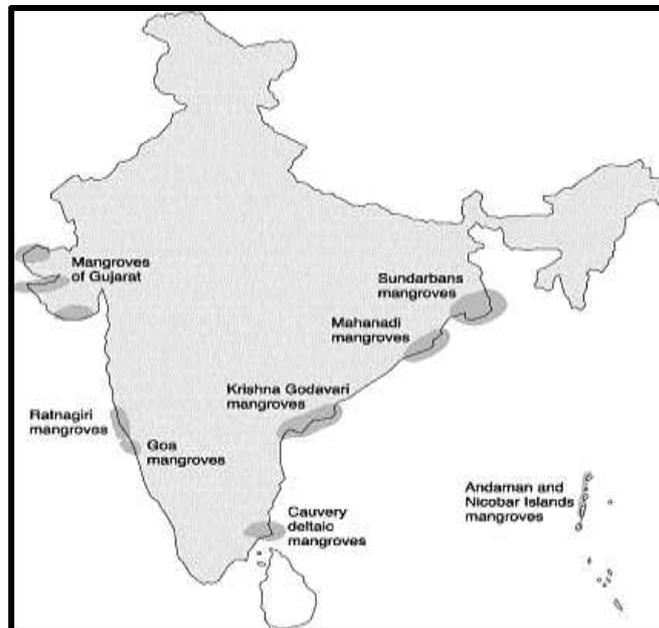
- LEMOA stands for **Logistics Exchange Memorandum of Agreement (LEMOA)**, a tweaked India-specific version of the Logistics Support Agreement (LSA), which the U.S. has with several countries it has close military to military cooperation.
- It is also **one of the three foundational agreements** — as referred to by the U.S.
- The three agreements — Logistics Support Agreement (LSA), Communications Interoperability and Security Memorandum of

Agreement (CISMOA) and Basic Exchange and Cooperation Agreement for Geo-spatial Cooperation (BECA) are referred to as the foundational agreements which the U.S. signs with countries with which it has close military ties.

- They are **meant to build basic ground work and promote interoperability between militaries by creating common standards and systems**. They also guide sale and transfer of high-end technologies.
- **LEMOA gives access, to both countries, to designated military facilities on either side for the purpose of refuelling and replenishment**. India and the U.S. already hold large number of joint exercises during which payments are done each time, which is a long and tedious process.
- Under the new agreement, a mechanism will be instituted for book-keeping and payments and officials, who will act as nodal points of contact, will be designated on both sides.
- The agreement **will primarily cover four areas — port calls, joint exercises, training and Humanitarian Assistance and Disaster Relief**.
- Any other requirement has to be agreed upon by both sides on a case-by-case basis.

Topic 19: Mangrove migration

Importance for Prelims: Environment



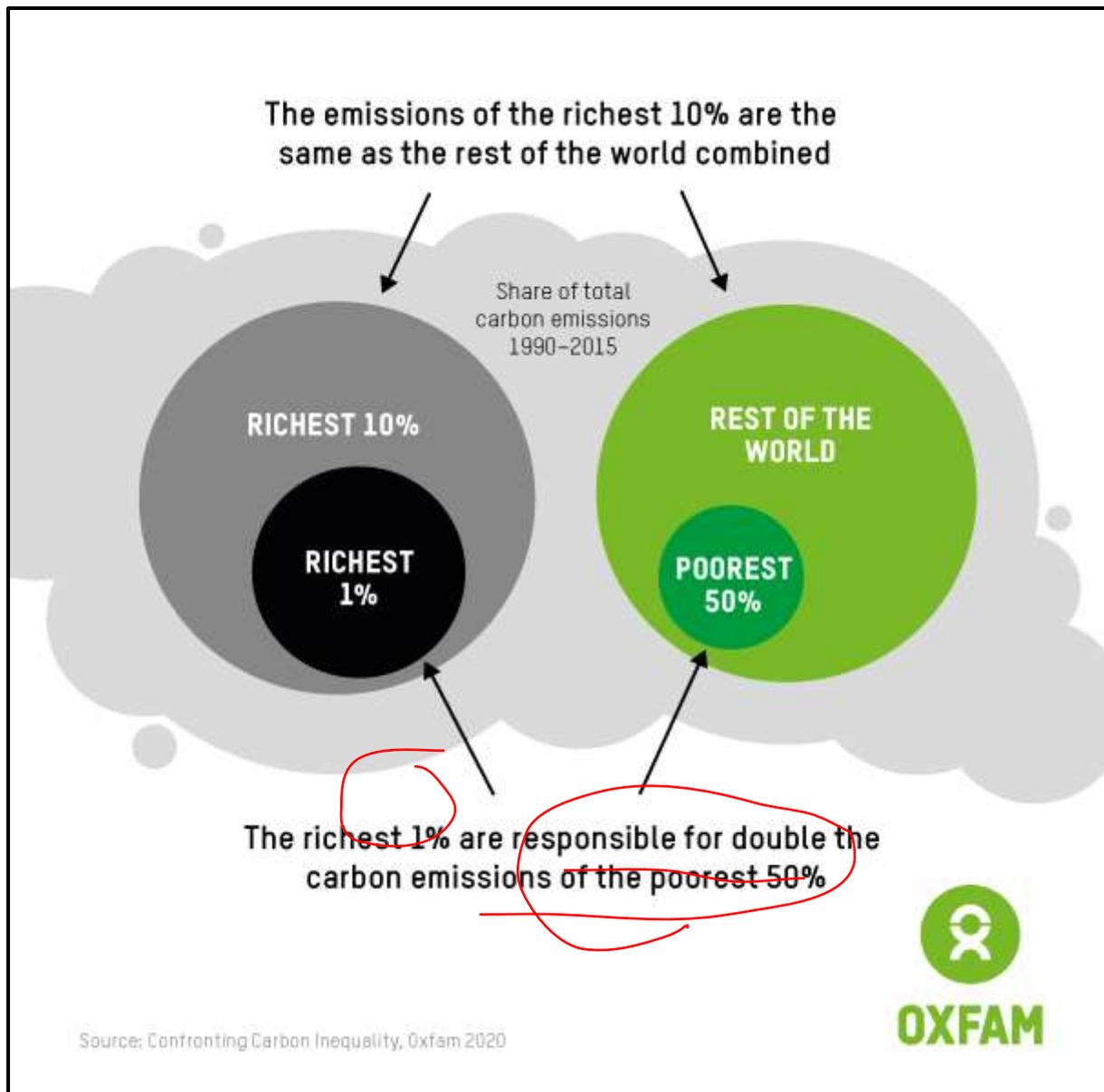
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Investigation of Mangroves distribution in the Hooghly estuary suggests that the mangroves have **started moving upstream, growing in less-saline regions.**

- Over years due to **gradual environmental changes and anthropogenic activities**, mangroves have started to redistribute. Sewage disposal has increased pollution load in the river waters. Globally, there is also rapid mean sea-level rise. All these might have played a role in this upstream migration
- This shows the potential of ***Sonneratiacaseolaris* to act as a bio-indicator of regional environmental changes.**
- The decline in the mangrove area along with this migration may increase the amplitude of coastal hazards such as storm surges, erosion and flooding.

Topic 20: Confronting Carbon Inequality

Importance for Prelims: Reports



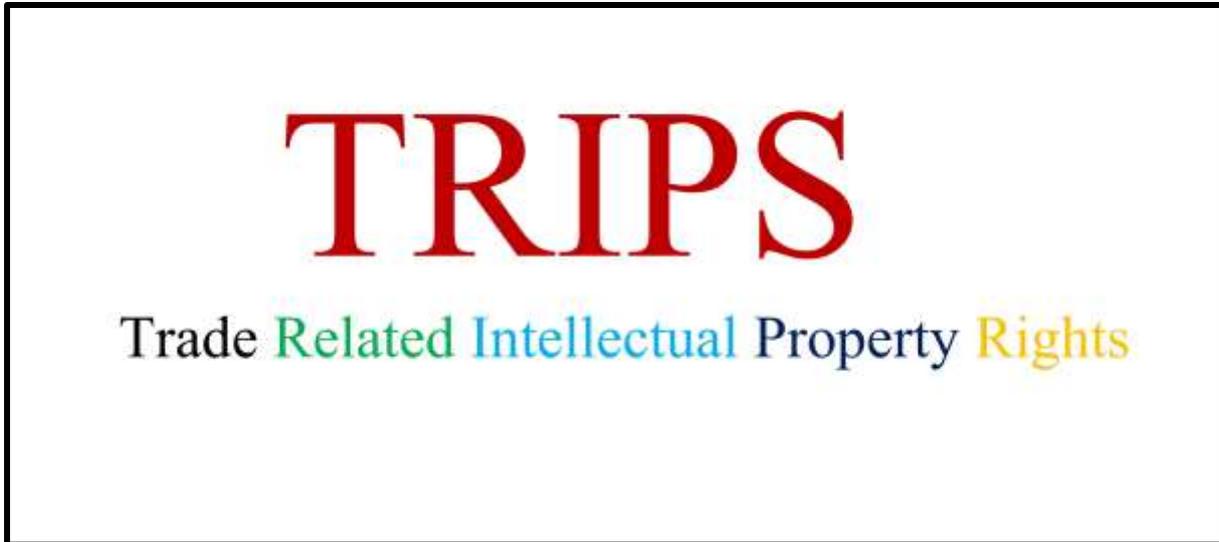
A rich person contributes more to the climate crisis than a poor person: **Between 1990 and 2015, the richest 1 per cent of humanity accounted for 15 per cent of cumulative emissions, while the poorest 50 per cent accounted for only 7 per cent,** a new report by Oxfam International and the Stockholm Environmental Institute (SEI)

has found.

- The global carbon budget is being rapidly depleted — not to afford communities around the world dignity and a decent standard of living — but to expand the consumption of the rich.
- Of this, **the largest share of emissions by the rich was from flights and cars, including private jets, luxury SUVs and sports cars, the report said.**
- The report underlined the **need to focus on clipping emissions of the richest 10 per cent:**Reduction of the per capita footprint to the 1.5°C-consistent level by 2030 would cut annual carbon emissions by over a third.
- About half of the emissions of the **richest 10 per cent are associated with North America and the European Union (EU).**
- **India's per capita emissions were a fraction of not just the EU (6.78 tCO₂ / person), but also China (7.95 tCO₂ / person), making it the lowest per capita emitter amongst the world's large economies.**
- The report briefly **acknowledged the intersectionality of income inequality and the climate crisis** with factors such as race, class, gender, caste and age. For example, gender pay inequity meant that men earned higher wages than women.

Topic 21: TRIPS FLEXIBILITY

Importance for Prelims: Schemes

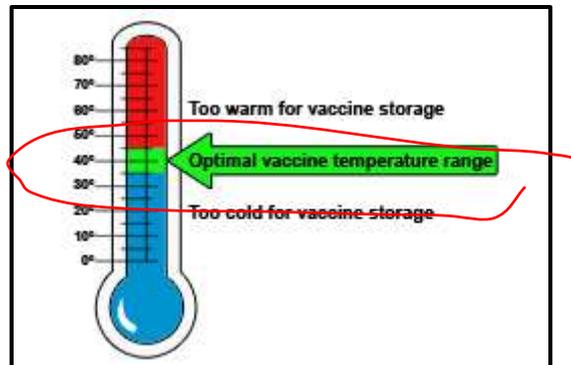


India and South Africa have requested the **World Trade Organization (WTO)** to waive certain conditions of the **Trade Related Aspects of Intellectual Property Rights (TRIPS)** agreement that could impede timely access to affordable medical products to combat **Covid-19**.

- According to these countries, many developing countries, may face institutional and legal difficulties when using flexibilities available in the TRIPS Agreement.
- **They are asking for waiver of following sections**
- These Sections are **1, 4, 5 and 7** which pertains to copyright and related rights, industrial designs, patents and the protection of undisclosed information.

Topic 22: Warm Vaccine

Importance for Prelims: Schemes



The biggest challenge to distribute Covid-19 vaccines to hundreds of millions of people is availability of enough freezers.

- Vaccines are similar to dairy or meat products in that their chemical structures are maintained when they are kept within certain temperature ranges. Therefore, vaccines need to be stored and transported at cold temperatures. This will lead to a big logistics challenge for covid-19 vaccine development and distribution.
- **Warm vaccine:** It is a vaccine that can maintain its chemical structure even in room temperature. This will help to manage the logistical challenge.

Topic 23: Narco and Polygraph test

Importance for Prelims: Schemes

Polygraph	Narco Analysis	Brain Mapping
Interrogating while measuring physiological changes	Drug induced method	Non-intrusive in nature
Interrogating with Standardized Questionnaire	Medical intrusion needed	Brainwaves' graphs computed to analyse
BP, Pulse, EEG, GSR, VSA analyzed	Subject made to speak in trance	Confirms if specific information available in brain
Physiological changes of involuntary processes measured	Age, sex, health of subject determines drug dose	Does not confirm how information stored in brain
Least reliable in deception detection	More reliable in deception detection	Most reliable in deception detection

There has been demand for narco test of all accused and family of victim in the Hathras case.

Polygraph analysis:

- It is based on the assumption that physiological responses that are triggered when a person is lying are different from what they would be otherwise.
- Instruments like cardio-cuffs or sensitive electrodes are attached to the person, and variables such as blood pressure, pulse, respiration, change in sweat gland activity, blood flow, etc., are measured as questions are put to them.
- A numerical value is assigned to each response to conclude whether the person is telling the truth, is deceiving, or is uncertain

Narcoanalysis:

- Narcoanalysis involves the injection of a drug, sodium pentothal, which induces a hypnotic or sedated state in which the subject's imagination is neutralized, and they are expected to divulge information that is true.
- The drug, referred to as "truth serum" in this context, was used in larger doses as anaesthesia during surgery, and is said to have been used during World War II for intelligence operations.
- Investigating agencies employ these tests in investigation, and are sometimes seen as being a "softer alternative" to torture or "third degree" to extract the truth from suspects.
- However, neither method has been proven scientifically to have a 100% success rate, and remain contentious in the medical field as well.

Topic 24: Cestrum aurantiacum and Lantana camara

Importance for Prelims: Environment



Iconic flora native to the Nilgiris, including more than 30 species of **Strobilanthes**, could be under threat of being displaced with the continuing advance of **invasive flora such as Cestrum aurantiacum and Lantana camara**

- The mass blooming of the **Strobilanthes kunthiana**, known commonly as the **neelakurinji**, gave the Nilgiris (the blue mountains) its iconic name as the slopes were **covered once in 12 years** by the mass blooming of the shrub.
- Recently, the blooming of the **Strobilanthes foliosa** has been reported in parts of the Nilgiris.
- There is prevalence of invasive species that have come to populate the habitats of the native **Strobilanthes** plants.
- While the habitat of the **Strobilanthes** plants in the upper Nilgiris is being eroded by the **Cestrum aurantiacum**, they are threatened by other invasive species like **Lantana camara** in the lower slopes.

Topic 25: GST council

Importance for Prelims: Economy



GST Council agrees to extend compensation cess beyond 2022

GST Council

- Goods & Services Tax Council is a **constitutional body for making recommendations** to the Union and State Government on issues related to Goods and Service Tax.
- As per **Article 279A (1) of the amended Constitution**, the **GST Council has to be constituted by the President** within 60 days of the commencement of Article 279A.
- As per **Article 279A of the amended Constitution**, the **GST Council** which will be a joint forum of the Centre and the States.
- As per Article 279A (4), the Council will make recommendations to the Union and the States on important issues related to GST, like the goods and services that may be subjected or exempted from GST, model GST Laws, principles that govern Place of Supply, threshold limits, GST rates

including the floor rates with bands, special rates for raising additional resources during natural calamities/disasters, special provisions for certain States, etc.

Compensation cess

- **Compensation cess** was introduced as relief for States for the loss of revenues arising from the implementation of GST.
- States, in lieu of giving up their powers to collect taxes on goods and services after local levies were subsumed under the GST, were guaranteed a **14 per cent tax revenue growth in the first five years** after GST implementation by the Central government.
- States' tax revenue as of **FY16 is considered as the base year** for the calculation of this 14 per cent growth.
- Any shortfall against it is supposed to be **compensated by the Centre using the funds specifically collected as compensation cess.**
- Compensation cess is **levied on five products considered to be 'sin'** or luxury goods like SUV, pan masala, cigattes.
- The collected compensation cess **flows into the Consolidated Fund of India**, and then **transferred to the Public Account of India**, where a GST compensation cess account has been created.
- States are **compensated bi-monthly** from the accumulated funds in this account.

Topic 26: India's K missile family

Importance for Prelims: Science and tech



A successful trial of the **nuclear capable Shaurya missile** was conducted by India

- Shaurya is a **land-based parallel of the submarine launched K-15 missile.**
- These **ballistic weapons belong to the K missile family** — codenamed after late Dr APJ Abdul Kalam — which are **launched from Arihant class of nuclear submarines.**
- The K family of missiles are primarily **Submarine Launched Ballistic Missiles (SLBMs)**, which have been indigenously developed by Defence Research and Development Organisation

(DRDO) and are named after DrKalam India has also developed and successfully tested multiple times the K-4 missiles from the family which has a range of 3500 km. It is reported that **more members of K-family — reportedly to have been codenamed K-5 and K-6 — with ranges of 5000 and 6000 km** are also under development.

- The capability of **being able to launch nuclear weapons submarine platforms** has great strategic importance in context of **achieving a nuclear triad**, especially in the light of ‘no first use’ policy of India.
- The sea-based underwater nuclear capable assets **significantly increases the second strike capability** of a country and thus boosts its nuclear deterrence.
- These submarines **can not only survive a first strike by the adversary but also can launch a strike in retaliation** thus achieving Credible Nuclear Deterrence.

Topic 27: Global vaccine-assessment network

Importance for Prelims: IR



Coalition for Epidemic Preparedness Innovations (CEPI) has announced a central global network of laboratories

- It helps to **assess and compare immunological responses generated by the Covid-19 vaccine candidates.**
- To establish this global vaccine-assessment network, CEPI has announced **partnerships with five clinical sample testing laboratories that included India's Translational Health Sciences and Technological Institute (THSTI).**
- The network will use the same testing reagents originating in the labs of Nexelis and PHE and follow common protocols to **measure the immunogenicity of multiple Covid-19 vaccine candidates**
- This approach will **ensure uniformity in assessment and**

informed identification of the most promising vaccine candidates. CEPI is actively negotiating with additional laboratories to participate in this network. Currently there are **wide range of Covid-19 vaccine approaches and technologies** deployed (eg, recombinant viral vectors, live attenuated vaccines, recombinant proteins and nucleic acids), standard evaluation of the true potential of these vaccine formulations becomes very complex.

- Through centralising the analysis of samples obtained from trials of Covid-19 vaccine candidates, the new clinical-sample-testing network will minimise variation in results obtained, which could otherwise arise due to such technical differences when carrying out independent analysis.

Topic 28: Postal ballots

Importance for Prelims: Polity



The Election Commission has announced that it will **allow those above the age of 65 as well as those under home or institutional quarantine to vote using postal ballots** during the Bihar elections.

- A restricted set of voters can exercise postal voting. Through this facility , **a voter can cast her vote remotely by recording her preference** on the ballot paper and sending it back to the election officer before counting.
- **Members of the armed forces** like the Army, Navy and Air Force, members of the armed police force of a state (serving outside the state), **government employees posted outside India and their spouses are entitled to vote only by post.** In other words, they can't vote in person.
- Voters **under preventive detention can also vote only by post.**
- Special voters such as the President of India, Vice President, Governors, Union Cabinet ministers, Speaker of the House and

government officers on poll duty have the option to vote by post. But they have to apply through a prescribed form to avail this facility.

- The **Returning Officer is supposed to print ballot papers within 24 hours of the last date of nomination withdrawal and dispatch them within a day.** This is done so that the ballot papers reach the concerned voter well before the polling date and she has enough time to send it back before the counting day.
- Postal ballot papers for members of the Armed Forces are sent through their record offices. For members of the armed police force of a state (serving outside the state), government employees posted outside India and their spouses, the ballot paper can be sent through post or electronically.
- For remaining categories ballot papers can be delivered personally or through post.
- After receiving it, the **voter can mark her preference with a tick mark or cross mark against the candidate's name.** They also have to fill up a duly attested declaration to the effect that they have marked the ballot paper.
- The ballot paper and the declaration are then placed in a sealed cover and **sent back to the Returning Officer before the time fixed for the commencement of counting of votes.**

Topic 29: NCPCR

Importance for Prelims: Polity



NCPCR is recently in news

- The National Commission for Protection of Child Rights (NCPCR) was **set up in March 2007 under the Commissions for Protection of Child Rights (CPCR) Act, 2005.**
- National Commission for Protection of Child Rights (NCPCR) is a **statutory body** under the administrative control of the Ministry of Women & Child Development.
- The Commission's Mandate is **to ensure that all Laws, Policies, Programmes, and Administrative Mechanisms are in consonance with the Child Rights** perspective as enshrined in the Constitution of India and also the UN Convention on the Rights of the Child. The Child is defined as a person in the 0 to

18 years age group.

- The Functions of the National Commission for Protection of Child Rights as laid out in the Commissions for Protection of Child Rights (CPCR) Act,2005 are as follow:
 - ✓ Examine and review the safeguards provided by or under any law for the time being in force for the protection of child rights and recommend measures for their effective implementation;
 - ✓ **Present to be central government, annually and at such other**
 - ✓ **intervals, as the commission may deem fit, reports upon working of those safeguards;**
 - ✓ **Inquire into violation of child rights** and recommend initiation of proceedings in such cases;
 - ✓ **Examine all factors that inhibit the enjoyment of rights of children** affected by terrorism, communal violence, riots, natural disaster, domestic violence, HIV/AIDS, trafficking, maltreatment, torture and exploitation, pornography and prostitution and recommend appropriate remedial measures;
 - ✓ **Look into the matters relating to the children in need of special care and protection including children in distress,** marginalized and disadvantaged children, children in conflict with law, juveniles children without family and children of prisoners and recommend appropriate remedial measures;

- ✓ Study treaties and other international instruments and undertake periodical review of existing policies, programmes and other activities on child rights and make recommendations for their effective implementation in the best interest of children;
- ✓ Inquire into complaints and take suomotu notice of matter.

Topic 30: Hepatitis C

Importance for Prelims: Science and tech .

HARVARD MEDICAL SCHOOL GUIDE
Conquering Hepatitis C
A curable cause of liver disease

Contents

- 2 What is hepatitis C?
- 3 Hepatitis C and your liver
- 4 Acute versus chronic infection
- 6 Conditions caused by hepatitis C
- 7 How does hepatitis C spread?
- 8 Who gets hepatitis C?
- 10 Who should be tested?
- 11 How can hepatitis C be prevented?
- 12 Diagnosis
- 13 Treatment: Acute or chronic infection?
- 15 Treatment: Direct-acting antivirals
- 19 Resources

Harvard Health Publishing
HARVARD MEDICAL SCHOOL
Trusted advice for a healthier life

Three scientists who discovered the virus Hepatitis C have won the 2020 Nobel Prize in Medicine or Physiology.

- Hepatitis is an **inflammation of the liver**. The condition can be self-limiting or can progress to fibrosis (scarring), cirrhosis or liver cancer.
- Hepatitis viruses are the most common cause of hepatitis in the world but other infections, toxic substances (e.g. alcohol, certain drugs), and autoimmune diseases can also cause hepatitis.
- There are 5 main hepatitis viruses, referred to as types A, B, C,

D and E. These 5 types are of greatest concern because of the burden of illness and death they cause and the potential for outbreaks and epidemic spread.

- In particular, **types B and C lead to chronic disease in hundreds of millions of people and, together, are the most common cause of liver cirrhosis and cancer.**
- Scientists have identified 5 unique hepatitis viruses, identified by the letters A, B, C, D, and E. While all cause liver disease, they vary in important ways.
- **Hepatitis A virus (HAV)** is present in the faeces of infected persons and is most often transmitted through consumption of contaminated water or food. Certain sex practices can also spread HAV. Infections are in many cases mild, with most people making a full recovery and remaining immune from further HAV infections. However, HAV infections can also be severe and life threatening. Most people in areas of the world with poor sanitation have been infected with this virus. Safe and effective vaccines are available to prevent HAV.
- **Hepatitis B virus (HBV)** is transmitted through exposure to infective blood, semen, and other body fluids. HBV can be transmitted from infected mothers to infants at the time of birth or from family member to infant in early childhood. Transmission may also occur through transfusions of HBV contaminated blood and blood products, contaminated injections

during medical procedures, and through injection drug use. HBV also poses a risk to healthcare workers who sustain accidental needle stick injuries while caring for infected-HBV patients. Safe and effective vaccines are available to prevent HBV.

- **Hepatitis C virus (HCV)** is mostly transmitted through exposure to infective blood. This may happen through transfusions of HCV contaminated blood and blood products, contaminated injections during medical procedures, and through injection drug use. Sexual transmission is also possible, but is much less common. There is no vaccine for HCV.
- **Hepatitis D virus (HDV)** infections occur only in those who are infected with HBV. The dual infection of HDV and HBV can result in a more serious disease and worse outcome. Hepatitis B vaccines provide protection from HDV infection.
- **Hepatitis E virus (HEV)** is mostly transmitted through consumption of contaminated water or food. HEV is a common cause of hepatitis outbreaks in developing parts of the world and is increasingly recognized as an important cause of disease in developed countries. Safe and effective vaccines to prevent HEV infection have been developed but are not widely available.

Topic 31: SMART

Importance for Prelims: Science and tech



India successfully tests 'game changer' SMART torpedo system for anti-submarine warfare

- **Supersonic Missile Assisted Release of Torpedo (SMART)** is a **missile assisted release of lightweight anti-submarine torpedo system** for antisubmarine warfare (ASW) operations far beyond the torpedo range.
- All the mission objectives (of SMART) including missile flight upto the range and altitude, separation of the nose cone, release of torpedo and deployment of velocity reduction mechanism (VRM) have been met perfectly SMART, when launched from warship or a truck-based coastal battery, **takes off like a regular supersonic missile.**
- It covers **most of its flight in the air at lower altitudes** with

two-way data link from the warship or an airborne submarine target detection system and provides the exact location of the hostile submarine to correct its flight path midway.

- Just when it approaches close enough to the submerged submarine, the missile will eject the torpedo system into the water and the autonomous torpedo will start moving towards its target to take out the submarine.

Topic 32: Buy Back

Importance for Prelims: Economy



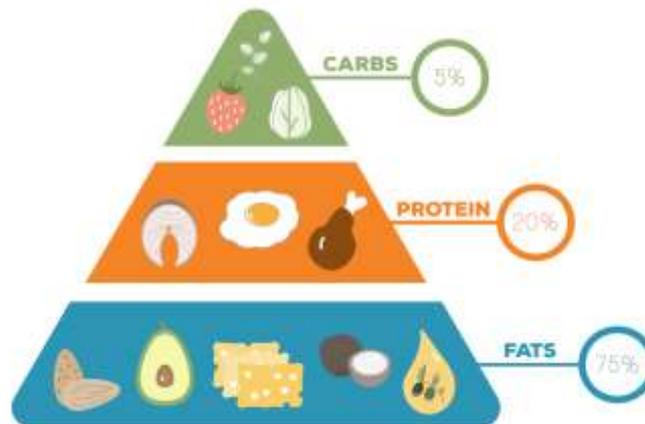
TCS company plans for a buy back

- A buyback, also known as a share repurchase, is when a **company buys its own outstanding shares** to reduce the number of shares available on the open market.
- Since companies raise equity capital through the sale of common and preferred shares, it may seem counter-intuitive that a business might choose to give that money back.
- However, there are numerous reasons why it may be beneficial to a company to repurchase its shares, including **ownership consolidation, undervaluation, and boosting its key financial ratios.**

Topic 33: Keto diet

Importance for Prelims: Science and tech

KETO DIET FOOD PYRAMID



There is fear of kidney failure in following a ketogenic diet.

- The ketogenic diet is one of the **most popular weight loss diets the world over**.
- It is a **high-fat, moderate-protein and low-carb diet that helps in weight loss by achieving ketosis** — a metabolic state where the **liver burns body fat and provides fuel for the body**, as there is limited access to glucose.
- A classic keto requires that 90 per cent of a person's calories come from fat, six per cent from protein and four per cent from carbs.

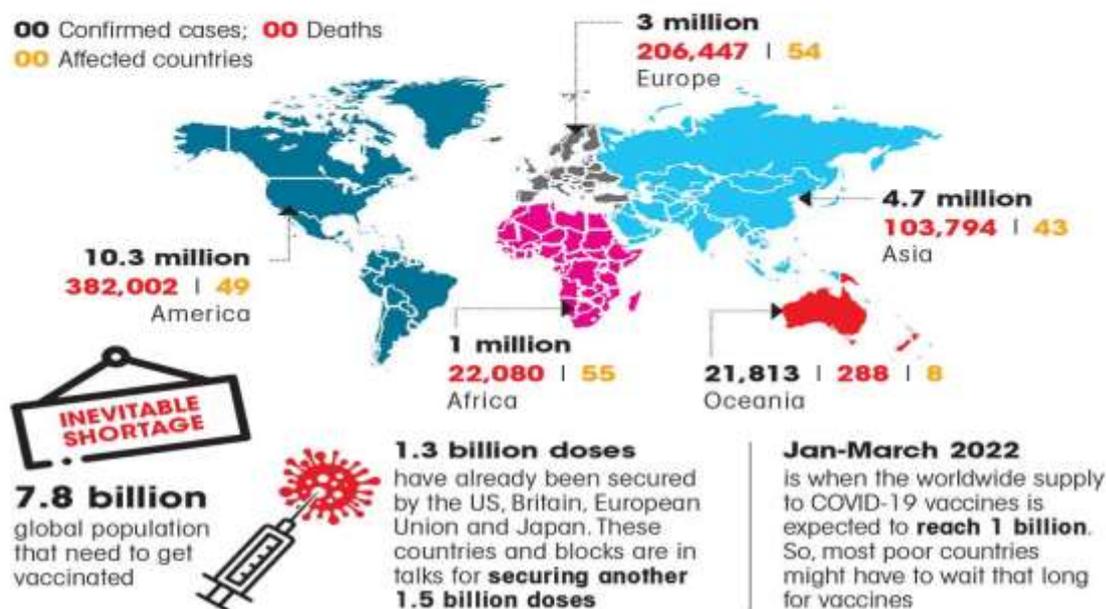
Topic 34: Vaccine nationalism

Importance for Prelims: IR

RISE OF VACCINE NATIONALISM

By August, 26 candidate vaccines for COVID-19 had entered clinical trials, with six in the final phase. While a vaccine may not be ready before the end of the year, rich countries have secured a billion doses, raising worries that the rest of the world will be at the back of the queue in the fight against the pandemic. WHO has cautioned the rich countries that they cannot remain safe if poor nations remain exposed

00 Confirmed cases; 00 Deaths
00 Affected countries



Selfish endeavours

Rich countries are pumping billions to pre-order vaccines for their people

United States
INVESTED IN 17 VACCINES

\$1.2 billion spent for 300 million doses of **AZD1222** with deliveries starting in October 2020

\$939 million in the vaccines developed by Johnson & Johnson's and Moderna

\$2.1 billion to Sanofi SA and GlaxoSmithKline for vaccines to cover 50 million people

14 promising candidates have been chosen from the 100+ candidates for US funding

\$485 million worth contracts with private players for prefilled syringes and vials

United Kingdom
INVESTED IN 3 VACCINES

The country has secured the **highest** number of potential **vaccine doses per capita**

\$86 million paid for **AZD1222** to get **first access to 30 million doses** by September 2020

90 million advance purchase order for vaccines developed by Valneva and Pfizer/BioNTech

European Union
INVESTED IN 1 VACCINE

400 million doses of AZD1222 will be shipped to Europe starting from the end of the year through the Inclusive Vaccines Alliance, set up by Germany, France, Italy and the Netherlands

Japan
INVESTED IN 1 VACCINE

120 million doses of vaccine developed by Pfizer and BioNTech by the end of June 2021. The supply should be enough to treat 60 million people

Analysis: Rajit Sengupta and Snigdha Das; Graphic: Sanjit

Source: Airlinity, media reports and European Centre for Disease Control and Prevention Disease Control and Prevention

Even as the novel coronavirus vaccine is still a few months away, several wealthier countries like Britain, France, Germany and the US have entered into pre-purchase agreements with Covid-19 vaccine manufacturers

- When a **country manages to secure doses of vaccines for its own citizens or residents** and prioritises its own domestic markets **before they are made available in other countries** it is known as ‘vaccine nationalism’.
- This is done **through pre-purchase agreements** between a government and a vaccine manufacturer.
- In order to **bring about equitable and broad access**, WHO, the Coalition for Epidemic Preparedness Innovations, and Gavi have come up with an initiative known as **“Covax Facility”**.
- The facility aims to procure at least two billion doses of Covid-19 vaccines by the end of next year for deployment and **distribution mainly in the low- and middle-income countries**

Topic 35: MSME Prerana

Importance for Prelims: Economy



Finance Minister Nirmala Sitharaman launched ‘MSME Prerana’, an online business mentoring programme for MSMEs by state-run Indian Bank

Objective :

- The programme, to be made available in local languages, is aimed at **empowering entrepreneurs through skill development and capacity building** workshops through Indian bank branches.
- The initiative is in collaboration with Poornatha & Co, a firm that designs entrepreneurial development programs in vernacular languages using online webbased interactive sessions and case studies.

- Spread over 12 sessions, the program enables MSME entrepreneurs to acquire expertise in handling finance and managerial skills, capacity to handle crises in business, understand the dynamics of credit rating and risk management.
- The first two programs will be in Tamil for the Coimbatore clusters of Indian Bank. It will then be scaled up across the country in Hindi, Telugu, Kannada, Bengali and Gujarati.

ABOUT MSME's:

Government schemes to promote MSMEs

- **Udyami Mitra Portal:** launched by SIDBI to improve accessibility of credit and handholding services to MSMEs

MSME Sambandh: To monitor the implementation of the public procurement from MSMEs by Central Public Sector Enterprises.

MSME Samadhaan-MSME Delayed Payment Portal — will empower Micro and Small entrepreneurs across the country to directly register their cases relating to delayed payments by Central Ministries / Departments / CPSEs / State Governments.

Digital MSME Scheme: It involves usage of Cloud Computing where MSMEs use the internet to access common as well as tailor-made IT infrastructure

Prime Minister Employment Generation Programme: It is a credit linked subsidy program under Ministry of MSME.

Revamped Scheme of Fund for Regeneration Of Traditional Industries

(SFURTI) : organizes traditional industries and artisans into clusters and make them competitive by enhancing their marketability & equipping them with improved skills.

A Scheme for Promoting Innovation, Rural Industry & Entrepreneurship

(ASPIRE) : creates new jobs & reduce unemployment, promotes entrepreneurship culture, facilitates innovative business solution etc.

Topic 36: PURCHASING MANAGER INDEX

Importance for Prelims: Economy

5 Key Indicators Under Purchasing Managers' Index (PMI)



The pace of contraction in services sector activity eased considerably in September after the government lifted some COVID-19 restrictions, but demand continued to shrink, prompting firms to cut more jobs, a business survey (PMI) showed recently.

- PMI is an **indicator of business activity- in the manufacturing and services sectors.**

Calculation of PMI

- It is a survey-based measure that asks the respondents about changes in their perception about key business variables as

compared with the previous month.

- It is calculated separately for the manufacturing and services sectors and then a composite index is constructed.
- The latest composite PMI decreased to 49.8 in September 2019 from 52.6 in August 2019.
- The PMI is a number from 0 to 100.
- PMI above 50 represents an expansion when compared to the previous month; PMI under 50 represents a contraction, and A reading at 50 indicates no change.
- Purpose: To provide information about current and future business conditions to company decision-makers, analysts, and investors. As the official data on industrial output, manufacturing and GDP growth comes much later, PMI helps to make informed decisions at an earlier stage

Topic 37: Black holes

Importance for Prelims: Science and tech



Royal Swedish Academy of Sciences decided to award one half of the 2020 Nobel Prize in physics to Roger Penrose and the other half jointly to Reinhard Genzel and Andrea Ghez for **furthering the understanding of black holes, the most “enigmatic” objects in the universe.**

- A **black hole is formed when stars collapse** and can be defined as a space in the universe with an **escape velocity so strong that even light cannot escape it.**
- Escape velocity is the speed at which an object must travel to override a planet or an object’s gravitational force.
- Since light cannot get out, **black holes are invisible and can**

only be tracked with the help of a space telescope or other special tools.

- And the reason light cannot escape is mainly that the **gravity inside a black hole is very strong as a result of a lot of matter being squeezed into a small space.**
- It acts like an ideal black body reflecting no light. It continues to grow, by absorbing mass from its surroundings.

Black hole merger

- Gravitational waves, postulated by Albert Einstein 100 years ago but discovered only in 2015 do not produce any sound on their own.
- These are just ripples created in the fabric of space-time by moving celestial objects just like a moving boat produces ripples in water.
- But when converted into audio signals, these can produce signature sounds that can reveal the origin of the gravitational waves.
- The gravitational wave detected on September 14, 2015, is now known to **have been produced by the merger of two black holes about 1.3 billion years ago.**
- Scientists already knew the kind of sound that gravitational waves emanating from such events were likely to produce.
- As two such dense and massive objects, black holes or neutron stars, are about to merge, **they start rotating around each**

other at almost the speed of light. The merger takes place within a fraction of a second.

- **The gravitational waves released in this last bit, when converted into audio signals, produce sound that is within audible range of human beings.**

LIGO

- The LIGO Scientific Collaboration (LSC) is a group of scientists **focused on the direct detection of gravitational waves**, using them to **explore the fundamental physics of gravity**, and developing the **emerging field of gravitational wave science as a tool of astronomical discovery.**
- The LSC works toward this goal through research on, and development of techniques for, gravitational wave detection; and the development, commissioning and exploitation of gravitational wave detectors.
- The project operates **three gravitational-wave (GW) detectors.** Two are at Hanford, Washington, north-western US, and one is at Livingston in Louisiana, south-eastern US.
- The proposed **LIGO India project aims to move one advanced LIGO detector from Hanford to India.**

VIRGO

- Virgo is a **giant laser interferometer designed to detect gravitational waves.**
- Virgo has been designed and built by a collaboration of the

French Centre National de la Recherche Scientifique (CNRS) and the Italian Istituto Nazionale di Fisica Nucleare (INFN)

- It is now operated and improved in Cascina, a small town near Pisa on the site of the European Gravitational Observatory (EGO), by an international collaboration of scientists from France, Italy, the Netherlands, Poland, and Hungary.

Working:

- It consists of two 3-kilometre-long arms, which house the various machinery required to form a laser interferometer.
- A **beam-splitter divides a laser beam into two equal components**, which are subsequently sent into the two interferometer arms.
- In each arm, a two-mirror Fabry-Perot resonant cavity extends the optical length.
- This is **because of multiple reflections that occur within each cavity and which consequently amplify the tiny distance variation caused by a gravitational wave**.
- The two beams of laser light that return from the two arms are recombined out of phase so that, in principle, no light reaches the so-called ‘dark fringe’ of the detector.
- **Any variation caused by an alteration in the distance between the mirrors**, produces a very small shift in phase between the beams and, thus, a **variation of the intensity of the light**, which is proportional to the wave’s amplitude.