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WEEK-5 SEPTEMBER 2020

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  SCIENCE & TECHNOLOGY

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— NOTE —

The current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

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SECTION: A
(MAINS)

CURRENT AFFAIRS

ENVIRONMENTALISM AT THE CORE

CONTEXT

The United Nations Millennium Development Goals and the World Bank Group's global practices have recognised sustainability as an essential issue of global importance.

⊙ BACKGROUND

- Humans have, since the Neolithic Agricultural Revolution and maybe even before then, been a consumer rather than a replenisher of environmental resources.

- From hunter-gatherer societies that moved into an area to use up its resources in a season before setting up camp or moving on, only to return the following year to do the same, the development of a surplus economy saw permanent settlements.

- Driven by technological advances and global integration, the strong economic growth experienced over the last century has been accompanied by gains in material welfare in all parts of the world.

- However, governments pursuing sustainable development face the challenge to balance the challenges and opportunities of growth and to decouple economic growth from environmental pressures.

- Given the global nature of challenges such as climate change it is imperative that countries build strong coalitions to address issues of common concern, and that they adapt institutions and decision making processes to ever-increasing globalization.

⊙ ANALYSIS

What is Sustainability?

- An ecosystem, a lifestyle, or a community that is sustainable is one which supports itself and its surroundings.

- This is a philosophy which is built on a solid foundation of sustainability.

- Sustainability itself can be defined by three core elements, each of which must be carefully considered in relation to the others:
  - ➤ Environmental Protection
  - ➤ Social Development
  - ➤ Economic Development

What is Environmental Sustainability?

- Environmental sustainability is understood as
  - ➤ buying greener products

  - ➤ avoiding hazardous materials
  - ➤ energy optimisation
  - ➤ waste reduction

How industries avoid the big picture of 'environmentalism'?

- While some firms are still reluctant to engage in environmentally beneficial activities as they are afraid to compromise on the economic benefits, some others have positioned environmental practices at the forefront due to legislation, and industry and government commitments.

- In several firms, high importance has been given to environmentalism due to compelling regulatory norms, and a potential to manage costs, risks and optimise eco-friendly practices.

- However, in this process, organisations, especially in the manufacturing sector, get so serious about the low-hanging fruits of waste reduction and energy efficiency improvements that they fail to recognise the need for restructuring their learning imperatives and see the big picture of environmentalism.

- While government norms, organisational policies and corporate environmental responsibility projects drive environment-friendly practices, these are merely short-term actions towards environmental sustainability.

How 'green supply chain' will help?

Only through organisational learning can people be urged to work towards long-lasting benefits. In this context, green supply chain practices are useful.

- These include green procurement, green manufacturing, green distribution, and reverse logistics.

- **Integrated environmental concerns:** With practices starting from acquisition of eco-friendly raw material to disposal/ reuse/ recycle of used products,employees, suppliers, distributors, retailers and customers will be able to integrate environmental concerns in the daily operations of a firm.

- **Higher economic performance**: Inter-linkages not only lead to a long-lasting natural drive towards environmental performance, but also to higher economic performance.

◉ **Organisational learning:** Thus, green supply chain practices enable organisational learning in environmental sustainability.

◉ **Better and eco-friendly strategies:** The resultant learning system smoothens the knowledge flow in the organisation and help firms to strategise for better performance, bearing in mind the environmental aspects.

◉ **Promotion at all level:** This further promotes environmentalism across all players in manufacturing supply chains. Thus, environmental sustainability is ensured from the source (willingness) and not through force (regulations).

Why 'drawing' and 'understanding' linkages between green supply chain is crucial?

◉ Drawing linkages between green supply chain practices, corporate environmental performance, corporate economic performance and the dimensions of learning organisations in firms is necessary for an organisation's progress and environmental protection in society.

◉ Understanding these inevitable links will enable managers and experts to shape their organisational values, work practices, and performances for the greater good of society.

◉ When the different players of a manufacturing supply chain realise the inherent benefits associated with organisational learning dimensions, their drive towards environmentalism increases.

◉ Policymakers should support this thinking by not merely imposing environmental practices as regulatory norms but by emphasising on the creation of green supply chain-based learning systems in manufacturing.

◉ CONCLUSION

Sustainability is extremely important as we cannot maintain our quality of life as human beings, the diversity of life on Earth, or Earth's ecosystems unless we embrace it. There are indications from all quarters and from the smallest to the largest scale that sustainability is something we must address.

It's high time to change the scenario by understanding and striving for sustainability—in our own homes, in our communities, in our ecosystems, and around the world.

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HOW VIABLE IS ONLINE EDUCATION?

CONTEXT

Skill-development needs experiment and experience, which may not be feasible in online learning.

⊙ ABOUT:

- The countrywide lockdown to curb the spread of the novel coronavirus disease (COVID-19), entwined with health and safety concerns, has brutally disrupted India's economy.

- The economic consequences of the pandemic as well as local lockdowns have been well-discussed and have surfaced in the gross domestic product and industrial production numbers. But there is another side to the ramifications: The lack of skillful imparting of education may translate into an economic adversity over time.

- India's gross enrollment ratio in higher education was a mere 27.4 per cent for 2017-18, according to the All India Survey on Higher Education (AISHE). This is not great news compared to other developing countries. The situation could be further battered by the possible decline in enrollment due to limited access to online education.
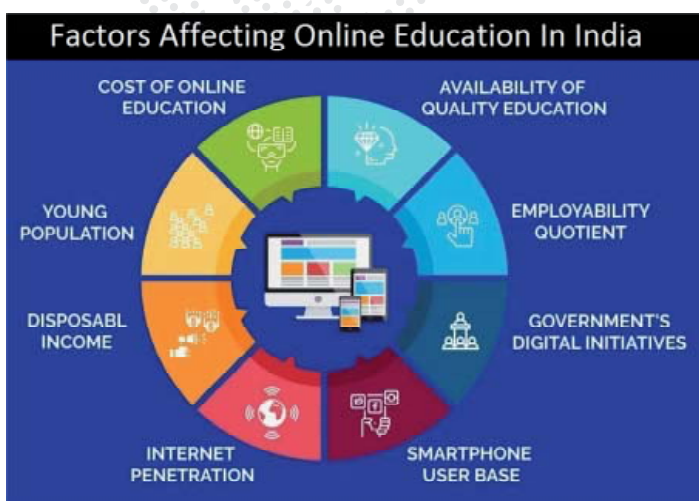
Viability of online education

- The internet and digital infrastructure with a significant penetration is a boon for education. The Pradhan Mantri e-Vidya Programme was launched in May to amplify the efforts for a better shift online.

- The top 100 universities in the country were permitted to start online courses in May, without the need to seek approval from education regulators. States such as Karnataka announced their own policies to make online education accessible.

Challenges

- Online education has not only changed how students are learning, but has also significantly altered the methods deployed by teachers and parents.

- A fundamental enabler is the digital infrastructure, which includes high-speed internet and supporting devices such as desktop, laptop, tablet or mobile phones.

- These prerequisites have expanded the gap between upper- and middle-economic sections, as well as urban and rural populations of our country. The infrastructure challenges in online education have rendered unprivileged learners helpless.

- Education and skill-development are dependent on each other. It is difficult to imagine students learning physics and chemistry only outside of laboratories. Similarly, an engineer cannot simply have the knowledge of combustion engine without the skill to design and operate it.

- It is, therefore, important to differentiate between knowledge and skill. While knowledge can be delivered and learned, skill-development needs experiment and experience that may not be feasible online.

- The industry-academia gap has existed in India for a very long time. A McKinsey report flagged the issue a decade ago: Only a quarter of engineers in India were truly employable.

- Online education producing graduates without skills may aggravate the employability issue further. This may lead to a deteriorating human capital and underemployment in the economy.

  - This adulteration in the education system may have a long gestation period. A large pool of unskilled human capital will come out of the online pedagogy to join the future workforce and face employability challenges. This may also mean that they will take longer to gain the requisite skills.

⊙ CONCLUSION

We must acknowledge and address these challenges. The lack of digital infrastructure in rural and underdeveloped sections has posed implementation challenges on the ground, leading to social inequalities in the country. Students, teachers and parents are sailing through the operational challenges to cope with the new online regime. It's high time that we start thinking about bridging the gap between rural and urban digital infrastructure for online education.

Factors Affecting Online Education In India

COST OF ONLINE EDUCATION

AVAILABILITY OF QUALITY EDUCATION

YOUNG POPULATION

EMPLOYABILITY QUOTIENT

DISPOSABL INCOME

GOVERNMENT'S DIGITAL INITIATIVES

INTERNET PENETRATION

SMARTPHONE USER BASE

WOMEN IN ARMED FORCES

CONTEXT

The Indian Navy announced that for the first time, two women officers will operate flying missions from warships.

◉ ABOUT:

- The Indian Navy announced **selection of two women officers** as Observers in the helicopter stream, making them first women airborne combatants who would be operating from warships.

- In another significant development in March 2020, the Supreme Court had upheld that the women Short Service Commission officers in the Navy were eligible for Permanent Commission.

- The Navy had also inducted the first woman pilot in December last year. A look at what these developments mean for women in the Navy, how the situation has evolved and the road ahead.

- In yet another milestone for women in the Navy, the Supreme Court in March this year upheld the right of serving women officers from the Short Service Commission in the Navy to be eligible for the getting permanent commission (PC).

A brief history of Women in Indian Navy

- Prior to 1992, women officers were inducted in the Navy only in the medical stream from the Armed Forces Medical Service.

- From July 1992, the Navy started inducting women, initially through a special entry scheme and later through the Short Service Commission, in only select branches of the Navy.

- Over the years, various branches were added to the list, and currently women officers can join the Navy in the streams of Air Traffic Control, Observers, Law, Logistics, Education, Naval Architecture, Pilots in Maritime Reconnaissance Stream only and the Naval Armament Inspectorate.

- It needs to be noted like in the Army and the Air Force, women are currently only inducted as Commissioned Officers and not in Other Ranks which are of categories of Junior Commissioned Officers and Non-Commissioned Officers.

- In the early 2000s women officers from the Medical and Logistics stream were deployed on board Naval ships. While these deployments went on only for four-five years, they were discontinued for various reasons.

Role of women officers in new streams

- Last December, the Navy announced the induction of a woman officer as pilot of Dornier aircraft, which are fixed wing aircraft operating from ashore establishments. Recently, the Navy announced induction of two women officers as observers for the helicopter stream. Observers are airborne tacticians who fly on board helicopters or fixed-wing aircraft operated by the Navy.

- Till now women were inducted as observers for fixed wing aircraft which take off and land ashore. Entry in the helicopter stream means that women officers can now be deployed on frontline warships from which helicopters can operate.

Various challenges towards deployment of women

- In terms of various challenges towards deployment of women onboard warships, the logistics part is not as challenging as one would imagine, especially as most of the large warships of the Navy do have basic living arrangements that can be allocated for women.

- The question of mindset and gender sensitization, on the other hand, is something many believe would require concerted efforts, and concrete steps are being taken in that direction.

- Serving and retired women officers from Armed forces in general and Navy in particular, sound a precautionary note against the celebrations about latest developments. They believe that the developments will have to actually result in more women coming into operational streams and new streams being opened for women in coming days. Some are also concerned that too much media and public attention on these new entrants can put unwanted pressure on them.

- While women officers appreciate the support of many male military leaders in these processes, they also highlight the resistance from the system as a whole.

◉ WAY FORWARD

- In the said ruling in the matter of case Union of India & Others Vs Annie Nagaraja & Others, Apex Court bench of Justices DY Chandrachud and Ajay

Rastogi have said, "The battle for gender equality is about confronting the battles of the mind. History is replete with examples where women have been denied their just entitlements under law and the right to fair and equal treatment in the workplace.

- In the context of the Armed Forces, specious reasons have been advanced by decision makers and administrators. They range from physiology, motherhood and physical attributes to the male dominated hierarchies.

- A hundred and one excuses are no answer to the constitutional entitlement to dignity, which attaches to every individual irrespective of gender, to fair and equal conditions of work and to a level playing field.

- A level playing field ensures that women have the opportunity to overcome their histories of discrimination with the surest of responses based on their competence, ability and performance."

◉ CONCLUSION:

Women officers hope that these developments would result in them being posted at commanding positions on the ships which are a key for career advancements in the operational streams and also someday lead to women being deployed for most challenging of the deployments including that in the submarines.

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60 YEARS OF THE INDUS WATER TREATY

CONTEXT

September 19 marks the 60th anniversary of the Indus Water Treaty (IWT) between India and Pakistan, a treaty that is often cited as an example of the possibilities of peaceful coexistence that exist despite the troubled relationship.

⊙ BACKGROUND

- Back in time, partitioning the Indus rivers system was inevitable after the Partition of India in 1947.

- India, being the upper riparian state has shown tremendous conviction in maintaining international law.

- However current developments may force it to change the way it been going about things.

- Since the partition in 1947, the distribution of rivers was a must. Pakistan was given the three western rivers. These are namely, Indus Jhelum and Chenab. India on the other hand was given the three eastern rivers- Ravi, Beas, and Satluj.

- India had been termed as very lenient. Considering the fact that it had allowed so much access to Pakistan despite being the upper riverian.

- With time the relations between the two nations soured, yet they remained committed to the international decisions.

- After the treaty, they fought 3 wars. Despite this, they were able to maintain international law.

- The Indus Waters Treaty, hailed as one of the finest, the most sophisticated and comprehensive international water treaties, remains a contentious issue even after 60 years. For India and Pakistan, the blame game carries on.

⊙ ANALYSIS

The Indus Water Treaty

- The Indus Water Treaty is a World Bank-brokered settlement signed in Karachi on September 19, 1960, between Pakistan and India to use the water available in the six rivers of the Indus system.

- The sharing formula devised after prolonged negotiations sliced the Indus system into two halves.

- Under this treaty, India got control over three 'eastern rivers':
  ➤ Beas
  ➤ Ravi
  ➤ Sutlej

- While Pakistan got control over three 'western rivers:
  ➤ Indus
  ➤ Chenab
  ➤ Jhelum

- India is allowed to use **20% water of the western rivers** for irrigation, power generation and transport purposes.

- IWT granted 3.6 million acre-feet (MAF) of "permissible storage capacity" to India on the western rivers but due to poor water development projects, 2-3 MAF of water easily flows into Pakistan.

- Equitable it may have seemed, but the fact remained that India conceded 80.52 percent of the aggregate water flows in the Indus system to Pakistan.

- It also gave Rs 83 crore in pounds sterling to Pakistan to help build replacement canals from the western rivers. Such generosity is unusual of an upper riparian.

- This treaty addressed specific water allocation issues-
  ➤ providing unique design requirements for the run-of-the-river dams to ensure steady water flow
  ➤ guarantee power generation through hydroelectricity
  ➤ provides a mechanism for consultation and arbitration should questions, disagreements, or disputes arise between the incumbents.

Important facts on Indus river

- The Indus is one of Asia's mightiest rivers. It is one of the most important rivers in the world running across three major Asian nations, namely China, India and Pakistan.

- It originates near the Mansarovar Lake in the Tibetan plateau, moves through India and runs most of its course through Pakistan, making it the longest river in Pakistan.

- The Indus was known to the ancient Indians in Sanskrit as Sindhu.
  ➤ Its name Indus comes from a western adoption of the name Sindhu.

> ➤ The Indus played a key role in one of the greatest ancient civilizations, the Indus Valley Civilization.

- From its source in the northwestern foothills of the Himalayas, it flows through the Indian state of Jammu & Kashmir and along the length of Pakistan to the Arabian Sea.

- The river and its five tributaries together make up the Indus Basin, which spans four countries and supports 215m people.

- The Indus is the western most River system in the subcontinent. Jhelum, Chenab, Ravi, Beas and Satluj are its main tributaries.

- It drains the largest number of glaciers and mountain slopes of the Karakorum, Ladakh, Zaskarand Himalayan Ranges.

Dispute over Indus Water Treaty?

- Even though India and Pakistan have been sharing the waters without major dispute, experts state that the agreement is not fairly negotiated as India is only allowed to use only 20% of the six-river Indus water system.

- Pakistan recently sought an international arbitration if India sought to build hydropower projects on the Jhelum and Chenab rivers.

- Though the agreement has been seen as one of the most successful water-sharing pacts, the current tension between the two South Asian neighbours might well lead to a flashpoint.

- Experts say that future wars could well be fought over water.

Can India 'revoke' the Treaty?

- The Indus Water Treaty has survived three wars between the two countries.

- Although India has often raised the issue, saying that for a treaty to work there had to be "mutual cooperation and trust" between the two sides, this seems to be more pressure tactics than any real threat to review the bilateral agreement.

- The idea that India can frighten Pakistan by threatening to cut off river waters or release excess water during monsoon season is nothing new.

- A unilateral abrogation of the treaty could attract global criticism and New Delhi would only use the rivers as pressure tactics and threaten Pakistan.

Recent issues and challenges

- Water disputes between India and Pakistan are deepening. For almost sixty years the Indus Waters Treaty (IWT) survived diplomatic tensions but recent upstream water infrastructure projects have rekindled conflicts.

- Although its framework regulating water distribution between the two states was generally accepted by both parties, the treaty came under increasing tension as the conflict in the disputed territory of Jammu and Kashmir deepened.

- The allocation of control over the tributaries of the Indus is still contested, and certain ambiguities have allowed India to build infrastructure legally, which Pakistan claims undermines its water security and the treaty itself. This ambiguity has led to polarised interpretations on both sides.

Challenges outside the scope of the treaty

- **Dangerous flooding due to global warming:** Global warming will raise the sea level and make Himalayan glaciers, the ultimate source of the Indus, melt ever faster. Dangerous flooding is expected to become more frequent and more severe.

- **Reduced rainfall:** Climate change is also expected to affect monsoon patterns in South Asia, and could result in less rainfall for India and Pakistan. This could be disastrous as summer monsoon rainfall provides 90% of India's total water supply.

- **Environmental degradation and massive deforestation:** Moreover, the basin's watershed area has suffered tremendous environmental degradation and massive deforestation on both sides of Kashmir, leading to a decrease in the annual water yield.

◉ CONCLUSION

In recent times, the calm between the two countries seems to come to an end. In the coming time, India might decide to take up some action and force a renegotiation. India might very well decide to ask international organizations to look into the matter.

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CAG SURVEY REPORT ON SCHOOL TOILETS

CONTEXT

The Comptroller and Auditor General of India (CAG) have found irregularities in the construction of toilets in schools in an audit report tabled before Parliament.

◉ ABOUT

- Public sector units claimed to have constructed 1.4 lakh toilets in government schools as part of a Right to Education project, but almost 40% of those surveyed by the Comptroller and Auditor General of India (CAG) were found to be non-existent, partially constructed, or unused.

- In an audit report presented in Parliament , the CAG said over 70% did not have running water facilities in the toilets, while 75% were not being maintained hygienically.

- Lack of dedicated funds, poor maintenance and poor water availability in toilets were identified as major challenges, and central public sector enterprises (CPSEs) were roped in to bridge the gap over a one year period.

The Swachh Vidyalaya Abhiyan

- The Swachh Vidyalaya Abhiyan was launched by the Ministry of Human Resource Development in September 2014 to meet the Right to Education Act's mandate that all schools must have separate toilets for boys and girls.

- It is the national campaign driving 'Clean India: Clean Schools'. A key feature of the campaign is to ensure that every school in India has a set of functioning and well maintained water, sanitation and hygiene facilities.

- Water, sanitation and hygiene in schools refers to a combination of technical and human development components that are necessary to produce a healthy school environment and to develop or support appropriate health and hygiene behaviours.

- The technical components include drinking water, hand washing, toilet and soap facilities in the school compound for use by children and teachers. The human development components are the activities that promote conditions within the school and the practices of children that help to prevent water, hygiene and sanitation related diseases.

Physical survey

- There are 10.8 lakh government schools in the country. Overall, more than 1.4 lakh toilets were built by 53 CPSEs, with significant support coming from power, coal and oil companies. The CAG audit conducted a physical survey of a sample of 2,695 toilets built by these companies in 15 States.

- Out of that sample, CPSEs identified but did not construct 83. Another 200 toilets were reported to be constructed, but were non-existent, while 86 toilets were only partially constructed.

- Another 691 toilets "were found not in use mainly due to lack of running water, lack of cleaning arrangements, damages to the toilets and other reasons like use of toilets for other purposes, toilets locked up, etc," said the audit report. Thus, almost 40% of toilets were non-existent, partially completed or unused.

No functional toilets

- Out of the 1,967 coeducational schools surveyed, 99 schools had no functional toilets while 436 had only one functional toilet, meaning that the objective of providing separate toilets for boys and girls was not fulfilled in 27% of the schools, said the CAG.

- In order to effectively change the behaviour of students, the project norms required the CPSEs to build toilets with running water and hand washing facilities, and to maintain the toilets for three to five years while charging the annual expenses to their CSR budgets.

- However, the survey found that 72% of constructed toilets had no running water facilities inside, while 55% had no hand washing facilities at all. The audit also noticed "cases of defective construction of toilets, non-provision of foundation/ramp/staircase and damaged/overflowed leach pit, which led to ineffective use of toilets," said the report.

- With regard to maintenance and sanitation, 75% of toilets did not follow the norm for daily cleaning at least once a day. The survey found that 715 toilets were not being cleaned at all, while 1,097 were being cleaned with a frequency of twice a week to once a month. "Cases of non-provision of soap, bucket, cleaning agents and disinfectants in toilets and inadequate cleanliness of pathway were also noticed," said the report.

The benefits of water sanitation and hygiene to school children

- Children who are healthy and well-nourished can fully participate in school and get the most from

the education. Hygiene education in schools helps promote those practices that would prevent water and sanitation related diseases as well as encourage healthy behaviour in future generations of adults.

◉ Girls are particularly vulnerable to dropping out of school, partly because many are reluctant to continue their education when toilets and washing facilities are not private, not safe or simply not available.

◉ When schools have appropriate, gender-separated facilities, an obstacle to attendance is removed. Thus having gender segregated toilets in schools particularly matters for girls. Gender norms and physiology make privacy more important for girls than boys, and biological realities mean that girls need adequate sanitary facilities at school to manage menstruation.

◉ Basic facilities that provide for good hygiene and privacy, along with sensitive health promotion assist girls to stay in school and complete their education.

◉ Hygiene in school also supports school nutrition. The simple act of washing hands with soap before eating the school mid day meal assists to break disease transmission routes. Children get the nutritional benefits intended, rather than ingesting bacteria, germs and viruses.

◉ Studies show that when hand washing becomes part of a child's daily routine the benefits to health are evident and the practice does not easily fade. School is therefore an ideal setting for teaching good hygiene behaviours that children can also carry home.

◉ Having safe water, toilet and hygiene facilities in schools promotes equity. All children are equal in their right to access to safe drinking water, sanitation and hygiene facilities, and all children gain benefits through the improved hygiene practices promoted in schools.

◉ By providing gender-segregated toilets, students are assured of privacy and dignity, a particularly important factor for girls' school attendance. By providing inclusive and accessible facilities, children with special needs are able to attend school and further contribute to the development of their society.

◉ Having a clean school fosters a child's pride in his or her school and community. It enables every child become an agent of change for improving water, sanitation and hygiene practices in their families and within their community. School water and sanitation clubs encourage students to participate in taking care of latrines and handwashing stations, and in providing safe water where necessary.

◉ Club members create rotating lists of responsibilities, sharing sanitation- and water-related chores among both boys and girls. This also fosters pride and ownership, and it counteracts the belief that these tasks are only for women and girls or particular social groups.

◉ Children with disabilities are also vulnerable to dropping out of school. Accessible school facilities are a key to school attendance for children with disabilities. An effective water, sanitation and hygiene programmes seeks to remove barriers by promoting inclusive design – user-friendly, child-friendly facilities that benefit all users, including adolescent girls, small children and children who are sick or disabled.

◉ CONCLUSION:

The provision of water, sanitation and hygiene facilities in school secures a healthy school environment and protects children from illness and exclusion. It is a first step towards a healthy physical learning environment, benefiting both learning and health. Hence the government should take proactive measures to implement the recommendations of the CAG.

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A WEB 3.0 REVOLUTION THAT COULD RELIEVE US OF OUR SOCIAL DILEMMAS

CONTEXT

Web 3.0 is the next step in the evolution of the Internet and Web applications.

⊚ BACKGROUND

- As is well known, the internet is a telecommunications network that was initially born in the military (in the 60s, under the name of Arpanet) and then moved to the scientific and academic community.

- The World Wide Web saw the light in 1991. At this point, the internet was ready to spread with a completely unexpected speed.

- The Internet has changed dramatically since its inception. From Internet Relay Chat (IRC) to modern social media, it has become a vital part of human interactions - and continues to evolve.

- Today, the internet has created astounding pathways for opportunity and success is an understatement.

- It has democratized access to information, created boundless economic opportunities and connected people worlds apart.

- In 1990, fewer than 1% of the world's population was online. Thirty years later, that number has jumped to 59% of the world's ever-growing population.

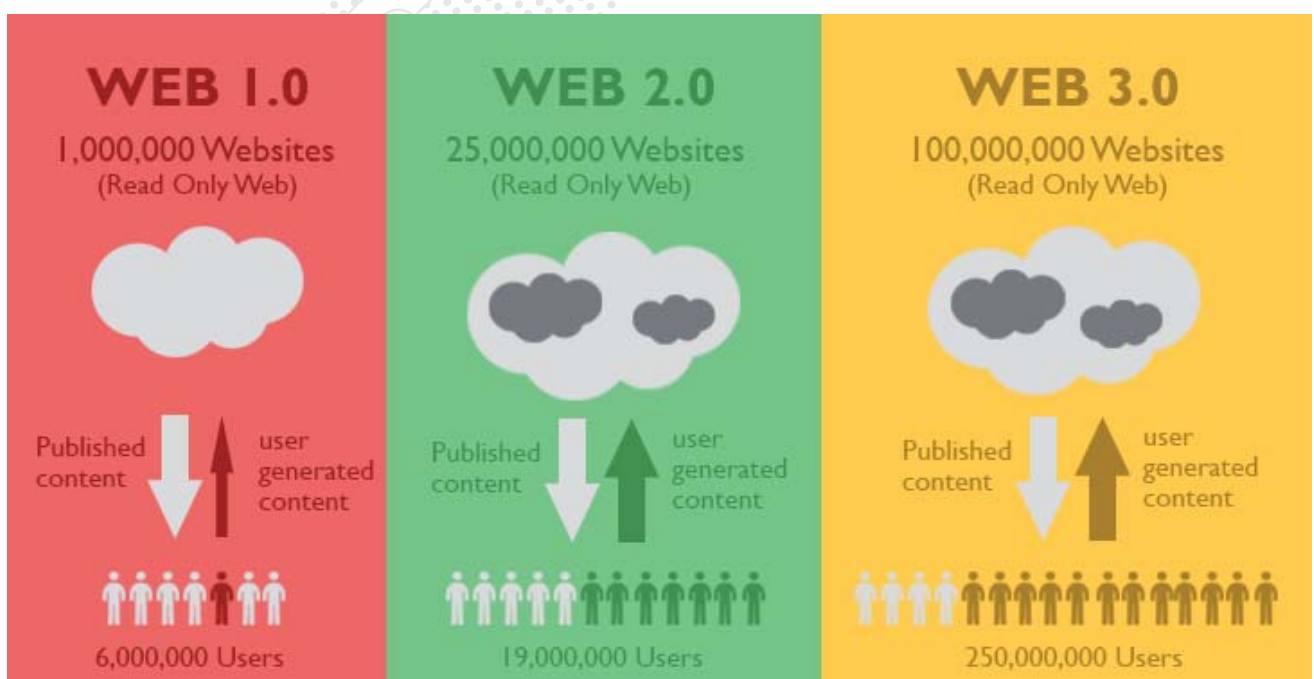- This growth has come at a price. Today's internet looks less like its inventors' visions of a decentralized, democratic information network and more like an oligopoly controlled largely by the companies that own the data.

  ➤ Big Tech platforms know for whom and what we search, who are our friends and family, what we like and dislike.

  ➤ These companies capitalize on our digital identities for their lucrative advertising-based business models, capturing enormous value at the expense of the privacy of their users.

  ➤ Most users accept the privacy and opportunity costs because of the convenience and value these services provide.

⊚ ANALYSIS

A brief history of the evolution of the Internet

Websites and web applications have changed dramatically over the last decades. They have evolved from static sites to data-driven sites that users can interact with and change.

WEB 1.0	WEB 2.0	WEB 3.0
1,000,000 Websites (Read Only Web)	25,000,000 Websites (Read Only Web)	100,000,000 Websites (Read Only Web)
Published content / user generated content	Published content / user generated content	Published content / user generated content
6,000,000 Users	19,000,000 Users	250,000,000 Users

- **Web 1.0**
  - ➤ The original Internet was based on what is now known as Web 1.0.
  - ➤ The term was coined in 1999 by author and web designer Darci DiNucci, when distinguishing between Web 1.0 and Web 2.0.
  - ➤ Back in the early 1990s, websites were built using static HTML pages that only had the ability to display information – there was no way for users to change the data.

- **Web 2.0**
  - ➤ That all changed during the late 1990s when the shift toward a more interactive Internet started taking form.
  - ➤ With Web 2.0, users were able to interact with websites through the use of databases, server-side processing, forms, and social media.
  - ➤ This brought forth a change from a static to a more dynamic web.
  - ➤ Web 2.0 brought an increased emphasis on user-generated content and interoperability between different sites and applications.
  - ➤ Web 2.0 was less about observation and more about participation.
  - ➤ By the mid-2000s, most websites made the transition to Web 2.0.

Understanding the 'new internet'

- ◎ Web 3.0 is the next generation of Internet technology that heavily relies on the use of machine learning and artificial intelligence (AI).
- ◎ It aims to create more open, connected, and intelligent websites and web applications, which focus on using a machine-based understanding of data.
- ◎ Through the use of AI and advanced machine learning techniques, Web 3.0 aims to provide more personalized and relevant information at a faster rate.
- ◎ This can be achieved through the use of smarter search algorithms and development in Big Data analytics.
- ◎ Current websites typically have static information or user-driven content, such as forums and social media.
- ◎ While this allows information to be published to a broad group of people, it may not cater to a specific user's need.
- ◎ A website should be able to tailor the information it provides to each individual user, similar to the dynamism of real-world human communication.

The 4 Properties of Web 3.0

- ◎ To understand the nuances and subtleties of Web 3.0, let's look at the four properties of Web 3.0:
  - ➤ Semantic Web
  - ➤ Artificial Intelligence
  - ➤ 3D Graphics
  - ➤ Ubiquitous

Challenges of Web 3.0 Implementation

- **Vastness:** The internet is HUGE. It contains billions of page and existing technology has not yet been able to eliminate all semantically duplicated terms. Any reasoning system which can read all this data and understand its functionality will have to be able to deal with vast amounts of data.

- **Vagueness:** User queries are not really specific and can be extremely vague at the best of times. Fuzzy logic is used to deal with vagueness.

- **Uncertainty:** The internet deals with scores of uncertain values. Probabilistic reasoning techniques are generally employed to address uncertainty.

- **Inconsistency:** Inconsistent data can lead to logical contradiction and unpredictive analysis.

- **Deceit:** While AI can help in filtering data, what if all the data provided is intentionally wrong and misleading. Cryptography techniques are currently utilized to stop this problem.

What makes Web 3.0 'superior' to its predecessors?

- ◎ **No central point of control:** Since middlemen are removed from the equation, user data will no longer be controlled by them. This reduces the risk of censorship by governments or corporations and cuts down the effectiveness of Denial-of-Service (DoS) attacks.

- ◎ **Increased information interconnectivity:** As more products become connected to the Internet, larger data sets provide algorithms with more information to analyze. This can help them provide more accurate information that accommodates the specific needs of the individual user.

- ◎ **More efficient browsing:** When using search engines, finding the best result used to be quite challenging. However, over the years, they have become better at finding semantically-relevant results based on search context and metadata. This results in a more convenient web browsing experience that can help anyone find the exact information they need with relative ease.

- ◎ **Improved advertising and marketing:** No one likes being bombarded with online ads. However, if the ads are relevant to one's interests and needs, they could be useful instead of being an

annoyance. Web 3.0 aims to improve advertising by leveraging smarter AI systems, and by targeting specific audiences based on consumer data.

◉ **Better customer support**: When it comes to websites and web applications, customer service is key for a smooth user experience. Due to the massive costs, though, many web services that become successful are unable to scale their customer service operations accordingly. Through the use of smarter chatbots that can talk to multiple customers simultaneously, users can enjoy a superior experience when dealing with support agents.

◉ **Trustworthy yet decentralized:** Instead of relying on trusted intermediaries to coordinate users, Web 3.0 systems use mechanisms such as cryptographic proofs and economic incentives to guarantee users that the system is working as expected. As a result, Web 3.0 networks are trustworthy, yet *decentralized*.

Closing thoughts

These systems require collective user cooperation to succeed, these projects make it a core tenet to protect, not exploit, their users and their privacy. These Web 3.0 systems – the new internet – could upend advertising-based business models, so far one of the most successful business models of all time.

Though there is no concrete definition for Web 3.0 yet, it is already set in motion and will surely continue towards further iterations.

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SECTION: B
(PRELIMS)
CURRENT AFFAIRS

DEATH OF SLOTH BEARS IN NANDANKANAN ZOOLOGICAL PARK

⊙ **CONTEXT:** Death of two sloth bears in two days in Bhubaneswar's Nandankanan Zoological Park, among the 14 big zoos of the country, has left the officials worried over the possible spread of some sort of bacterial or viral infection.

⊙ **ABOUT:**

- **Sloth Bear**

  ⊙ The sloth bear is a **myrmecophagous bear species**.

  ⊙ It is listed as **Vulnerable** on the **IUCN Red List**, mainly because of habitat loss and degradation.

  ⊙ The shaggy-coated sloth bear is native to India, Sri Lanka and Nepal. Sloth bears primarily eat termites and ants, and unlike other bear species, they routinely carry their cubs on their backs.

  ⊙ Sloth bears are the only bears that carry their young on their back.

    ➤ **Class:** Mammalia

    ➤ **Order:** Carnivora

    ➤ **Family:** Ursidae

    ➤ **Genus and Species:** *Melursus ursinus*

Important facts on Nandankanan Zoological Park

- Nandankanan Zoological Park is a premier large zoo of India. Unlike other zoos in the country, Nandankanan is built right inside the forest and set in a completely natural environment.

- Nandankanan is 15 kms from Odisha's capital, Bhubaneswar.

- Nandankanan is the first zoo in the World to breed White tiger and Melanistic tiger.

- It is the only conservation breeding centre of **Indian Pangolins** in the world.

- Also, it is the only zoological park in India to become an institutional member of **World Association of Zoos and Aquarium (WAZA).**

    ➤ Founded in 1935, the WAZA is the global alliance of regional associations, national federations, zoos and aquariums, dedicated to the care and conservation of animals and their habitats around the world.

- Nandankanan is the first zoo in India where endangered Ratel was born in captivity.

- Nandankanan is the only zoo in India to have an Open-top Leopard Enclosure.

- Nandankanan is the **second largest heronry** for Open Billied Storks in Odisha.

KOMODO DRAGONS COULD BECOME EXTINCT SOON DUE TO CLIMATE CHANGE

⊙ **CONTEXT:** The Komodo dragon, the world's largest lizard, could become extinct in the next few decades due to climate change.

⊙ **ABOUT:**

- Komodo dragons, or Komodo monitors, are the largest, heaviest lizards in the world — and one of the few with a venomous bite.

- Komodo dragons are large lizards with long tails, strong and agile necks, and sturdy limbs.

- Komodo dragons are limited to a few Indonesian islands of the Lesser Sunda group, including Rintja, Padar and Flores, and of course the island of Komodo, the largest at 22 miles (35 kilometers) long. They have not been seen on the island of Padar since the 1970s.

- They live in tropical savanna forests but range widely over the islands, from beach to ridge top.

- Its current population consists of only 4,000 individuals.

  - ◉ Class: Reptilia

  - ◉ Order: Squamata

  - ◉ Family: Varanidae

  - ◉ Genus and Species: *Varanus komodoensis*

How climate change can take a toll on their population?

- Climate change is likely to cause a sharp decline in the availability of habitat for Komodo dragons, severely reducing their abundance in a matter of decades

- Warming and increasing sea levels will reduce the range of komodo dragon habitats and potential lead to the disappearance of this species.

- By 2050, komodo dragon habitats could shrink by up to 87 percent and cause virtually their entire population to collapse.

CAROTAR RULES 2020

⊙ **CONTEXT :**

Customs (Administration of Rules of Origin under Trade Agreements) Rules, 2020 sets guidelines for enforcement of the 'rules of origin' for allowing preferential rate on imports under free trade agreements took effect as of September 21, 2020.

⊙ **ABOUT**

- CAROTAR, 2020 aims to protect the domestic industry from misuse of FTAs.

- CAROTAR, 2020 supplement the existing operational certification procedures prescribed under different trade agreements (FTA/ PTA/ CECA/ CEPA).

- An importer is now required to do due diligence before importing the goods to ensure that they meet the prescribed originating criteria.

- A list of minimum information which the importer is required to possess has also been provided in the rules along with general guidance.

- Also, an importer would now have to enter certain origin related information in the Bill of Entry, as available in the Certificate of Origin.

> **Free Trade Agreement**
>
> - A free trade agreement (FTA) is a treaty between two or more countries to facilitate trade and eliminate trade barriers. It aims at eliminating tariffs completely from day one or over a certain number of years.
>
> - Free trade agreements helps create an open and competitive international marketplace.

Significance of the new Rules

- The new Rules will support the importer to correctly ascertain the country of origin, properly claim the concessional duty and assist Customs authorities in smooth clearance of legitimate imports under FTAs.

- The new Rules would strengthen the hands of the Customs in checking any attempted misuse of the duty concessions under FTAs.

IEA AND NITI AAYOG LAUNCH SPECIAL REPORT ON SUSTAINABLE RECOVERY POST COVID-19

◉ **CONTEXT:** **Against the backdrop of the ongoing Covid-19 crisis, International Energy Agency (IEA), in collaboration with NITI Aayog, presented a 'Special Report on Sustainable Recovery'.**

◉ **ABOUT**
- It is a part of IEA's flagship **World Energy Outlook** series.

- The report proposes a number of actions that could be taken over the next three years to revitalize economies and boost employment while making energy systems cleaner and more resilient.

- It details energy-focused policies and investments that could help to-

  ◎ boost economic growth

  ◎ create jobs

  ◎ put emissions into structural decline while making energy systems lower-cost, secure and resilient

> **International Energy Agency**
> - The International Energy Agency is a Paris-based autonomous intergovernmental organisation.
> - It was established in the framework of the **Organisation for Economic Co-operation and Development (OECD)** in 1974 in the wake of the **1973 oil crisis**.

Key-sectors for creating jobs:

- The report mentions key sectors for creating jobs:

  ◎ Electricity

  ◎ Transportation

  ◎ Buildings

  ◎ Industry

  ◎ Sustainable biofuels and innovations

A combination of policy actions and targeted investments will offer huge benefits to the economy and generate jobs.

NSE IFSC-SGX CONNECT

⊙ **CONTEXT:** The National Stock Exchange (NSE) and the Singapore Exchange (SGX) have entered into a formal agreement to cement the key terms for operationalising the 'NSE IFSC-SGX Connect', which will bring international and Gujarat International Finance Tec-City (GIFT) participants together to create a bigger liquidity pool for Nifty products in GIFT City.

⊙ **ABOUT:**
- **Indian Financial System Code (IFSC)**
  - ⊙ IFSC is a jurisdiction that provides financial services to resident and non-resident Indians in foreign currencies.
  - ⊙ GIFT IFSC will be a deemed foreign territory dealing in foreign currency.
  - ⊙ The units in IFSC will be recognised as non-resident entity under the FEMA regulations of Reserve Bank of India.

  Gujarat International Finance Tec-City Co. Ltd (GIFT) is being developed as the country's first international financial services centre (IFSC).

  ### What are the services an IFSC can provide?
  - Fund-raising services for individuals, corporations and governments
  - Asset management and global portfolio diversification undertaken by pension funds, insurance companies and mutual funds
  - Wealth management
  - Global tax management and cross-border tax liability optimization, which provides a business opportunity for financial intermediaries, accountants and law firms.
  - Global and regional corporate treasury management operations that involve fund-raising, liquidity investment and management and asset-liability matching
  - Risk management operations such as insurance and reinsurance
  - Merger and acquisition activities among trans-national corporations

⊙ **BACKGROUND**
- The two exchanges (NSE and SGX) have been locked in a dispute for the past couple of years after India's three main bourses unexpectedly announced in February 2018 that they would stop licensing their indexes to foreign bourses from August that year.
- NSE's Nifty futures and options, which are traded in the island nation, are popular with foreign investors who are not keen on trading in India.
- An Indian court that year referred the dispute to an arbitrator. The two parties have now reached an agreement for operationalising the NSE IFSC-SGX Connect and thereby withdraw the arbitration proceedings.

Significance of the development
- **Strengthening of the system:** The Connect will broaden the international and domestic participant base and further strengthen the capital market ecosystem in GIFT city resulting in more broad based development across asset classes and capital raising activity.
- **Ease of access to international investors:** The integration of GIFT City ecosystem with the international financial markets would lead to development of vibrant and liquid markets for India access products at GIFT City with the ease of access to international investors.

WORLD RISK INDEX (WRI) 2020

⊙ **CONTEXT:**   India was 'poorly prepared' to deal with 'climate reality', due to which it was more vulnerable to extreme natural disasters, according to the World Risk Index (WRI) 2020.

⊙ **ABOUT:**

- **What is World Risk Index?**

    ⊚ The WRI is part of the **World Risk Report 2020** released by the **United Nations University Institute for Environment and Human Security (UNU-EHS)** and **Bundnis Entwicklung Hilft**, in cooperation with the **University of Stuttgart** in Germany.

    ⊚ The WRI is calculated on a country-by-country basis, through the multiplication of exposure and vulnerability.

    ⊚ The WRI, released annually since 2011, indicates which countries are in the greatest need to strengthen measures for coping with and adapting to extreme natural events.

Key-takeaways from the Report

- India ranked 89th among 181 countries. The country was fourth-most-at- risk in south Asia on the index, after Bangladesh, Afghanistan and Pakistan.

- Sri Lanka, Bhutan and the Maldives fared better than India in their abilities to cope with extreme disasters.

- India also lagged behind these three neighbours in terms of lack of adaptive capacities or the preparedness to deal with extreme events.

- India and other south Asian nations did improve their ranking marginally in the World Risk Index during the course of a year. Bhutan improved its ranking the most, followed by Pakistan.

Country	Global rank in World Risk Index 2020	Global rank in World Risk Index 2019
Afghanistan	57	53
Bangladesh	13	10
Bhutan	152	143
India	89	85
Maldives	171	169
Nepal	121	116
Pakistan	87	80
Sri Lanka	74	73

Significance of the Index

- **Raising awareness:** The Index shows the level of risk for each country and provides a global overview. It is an important tool for communication and awareness raising.

- **Focus on society's capacity:** It underscores that risks are heavily determined by the susceptibility and the coping as well as the adaptive capacity of a society.

THE WITHERING OF ARAB LEAGUE

⊙ **CONTEXT:**

The Palestinians have stepped down from a key Arab League role in protest at the regional bloc's failure to take a stand against Israeli-Arab deals.

⊙ **ABOUT:**

- The League of Arab States, or Arab League, is a voluntary association of countries whose peoples are mainly Arabic speaking or where Arabic is an official language.

- Its stated aims are to strengthen ties among member states, coordinate their policies and direct them towards a common good.

- It has 22 members including Palestine, which the League regards as an independent state.

  ◉ The Arab World consists of 22 countries in the Middle East and North Africa: Algeria, Bahrain, the Comoros Islands, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Mauritania, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, the United Arab Emirates, and Yemen.

How does it function?

- The highest body of the league is the Council, composed of representatives of member states, usually foreign ministers, their representatives or permanent delegates. Each member state has one vote, irrespective of its size.

- The council meets twice a year, in March and September, and may convene a special session at the request of two members.

- Day-to-day, the league is run by the general secretariat. Headed by a secretary-general, it is the administrative body of the league and the executive body of the council and the specialised ministerial councils.

Reason behind Palestine's decision

- The Palestinians had been hoping the League would condemn deals signed last week in Washington, where the United Arab Emirates and Bahrain agreed to normalize ties with Israel.

- The Palestinians called it a betrayal and said normalization should be offered only in return for Israel's withdrawal from Palestinian territories

- Earlier this month, the Palestinians failed to persuade the Arab League to condemn nations breaking ranks and normalising relations with Israel.

What's the latest normalisation 'Deal'?

- The United Arab Emirates (UAE) and Bahrain are the latest countries in the Arab region to formally establish diplomatic ties with Israel in **deals brokered by the United States**.

- The only two Arab countries Israel has signed peace treaties with are Egypt and Jordan, in 1979 and 1994 respectively.

  ◉ Egypt and Jordan share borders with Israel and have both fought wars with Israel in the past.

But the latest normalisation deals with Israel come as part of a broader diplomatic push by US, which earlier this year revealed the so-called Middle East peace plan, which has been categorically rejected by the Palestinians.

BILATERAL NETTING OF QUALIFIED FINANCIAL CONTRACTS BILL, 2020

⊙ **CONTEXT:**   **In a latest development, Parliament passed Bilateral Netting of Qualified Financial Contracts Bill, 2020 that seeks to provide a legal framework for bilateral netting of qualified financial contracts.**

Key-provisions of the Bill

- The bill covers trades that are negotiated bilaterally including cross-currency or interest rate or commodity swaps, currency or interest rate futures or options and spot, future or forward foreign exchange transactions.
  - These include credit derivatives such as the credit default swaps and commodity derivatives such as electricity derivatives, oil derivatives, coal derivatives or gas derivatives.
- The Bill covers financial contracts entered into on bilateral basis outside clearing system.
- Bilateral contracts constitute 40 per cent of total financial contracts while multilateral contracts constitute 60 per cent.
- **Applicability:** The provisions of the Bill will apply to QFCs between two qualified financial market participants, where at least one party is an entity regulated by the specified authorities (RBI, SEBI, IRDAI, PFRDA or the IFSCA).

Bilateral netting:

- Netting refers to offsetting of all claims arising from dealings between two parties, to determine a net amount payable or receivable from one party to other.

Qualified financial contracts (QFC):

- QFC means any bilateral contract notified as a QFC by the relevant authority.
  - The authority can be Reserve Bank of India (RBI), Securities and Exchange Board of India (SEBI), Insurance Regulatory and Development Authority of India (IRDAI), Pension Fund Regulatory and Development Authority (PFRDA) or International Financial Services Centres Authority (IFSCA).
- **Qualified financial market participant:** The relevant authority may, by notification, designate an entity regulated by it as a qualified financial market participant to deal in QFCs. This would include entities such as non-banking finance companies (NBFCs), insurance companies and pension funds.

Close-out netting arrangement:

- Close-out netting refers to the termination of all obligations arising out of relevant QFCs.
- The process may be initiated by a party to the QFC in the case of:
  - a default (failure to honour the obligations of a QFC) by the other party
  - a termination event, as specified in the netting agreement that gives one or both parties the right to terminate transactions under the agreement.

The need

- Under existing laws, banks have to make higher provisions for such bilateral contracts which are outside the **Clearing Corporation of India's framework** since calculations are done on a gross basis rather than a net basis.

- This bilateral netting legislation will help us in evaluating risks far more in real-time basis and actual risk assessment will happen rather than a notional risk assessment based on the gross figures.

CENTRE ALLOWS ADDITIONAL BORROWING BY FIVE STATES

⊙ **CONTEXT:**

The Centre permitted five states to go for additional borrowing of 9,913 crore through Open Market Borrowings (OMBs) to meet their expenditure requirements amid falling revenues due to the COVID-19 crisis.

⊙ **ABOUT:**

- **What are Open Market Operations?**
  - OMOs are the market operations conducted by the RBI by way of sale/ purchase of G-Secs to/ from the market with an objective to adjust the rupee liquidity conditions in the market on a durable basis.
    - ➤ A Government Security (G-Sec) is a **tradeable instrument** issued by the Central Government or the State Governments.
    - ➤ It acknowledges the **Government's debt obligation**.
    - ➤ Such securities are
      - **short term** (usually called treasury bills, with original maturities of less than one year) or;
      - **long term** (usually called Government bonds or dated securities with original maturity of one year or more)
    - ➤ In India, the **Central Government** issues both, treasury bills and bonds or dated securities while the **State Governments** issue only bonds or dated securities, which are called the State Development Loans (SDLs).
      - G-Secs carry practically no risk of default and, hence, are called **risk-free gilt-edged instruments.**
  - When the RBI feels that there is excess liquidity in the market, it resorts to sale of securities thereby sucking out the rupee liquidity.
  - Similarly, when the liquidity conditions are tight, RBI may buy securities from the market, thereby releasing liquidity into the market.

Key-highlights

- These five states are Andhra Pradesh, Telangana, Goa, Karnataka and Tripura.
- The permission has been accorded after these states successfully met the reform condition of implementation of 'One Nation One Ration Card' system.

> **The recent raise**
> - In May this year, the government raised the net borrowing limit for state governments from 3% of G-SDP to 5% to make available an additional Rs 4.28 lakh crore to all the states combined.
> - While 0.5 percentage point of the extra borrowing window will be available to all states unconditionally, 1 pps will be made available in four equal tranches with each to clearly "specified, measurable and feasible reform actions".

- The balance 0.5 pps can be accessed if milestones are 'completely achieved' in at least three out of four reform areas.
- The reform linkage will be in four areas –
  ➤ universalisation of 'One Nation One Ration Card'
  ➤ ease of doing business
  ➤ power distribution
  ➤ augmentation of urban local body revenues

The constitutional framework

- A state government can borrow within India (not abroad) upon the security of the **Consolidated Fund of the State.**
- **Article 293(3)** of the Constitution requires states to obtain the Centre's consent in order to borrow in case the state is indebted to the Centre over a previous loan.
- Every single state is currently indebted to the Centre and thus, all of them require the Centre's consent in order to borrow.
- In practice, the Centre has been exercising this power in accordance with the **recommendations of the Finance Commission.**
- This consent can also be granted subject to certain conditions by virtue of **Article 293(4).** This is the source of the power exercised by the Centre in the present instance.

Origin of Article 293:

- The origin of Article 293 in its current form can be traced to **Section 163** of the **Government of India Act, 1935.**
- However, the colonial law expressly stated that the Centre shall not seek to impose **"any condition which is unreasonable".**
- If a dispute were to arise regarding any condition, the matter had to be referred to the Governor-General, who would take a final decision.
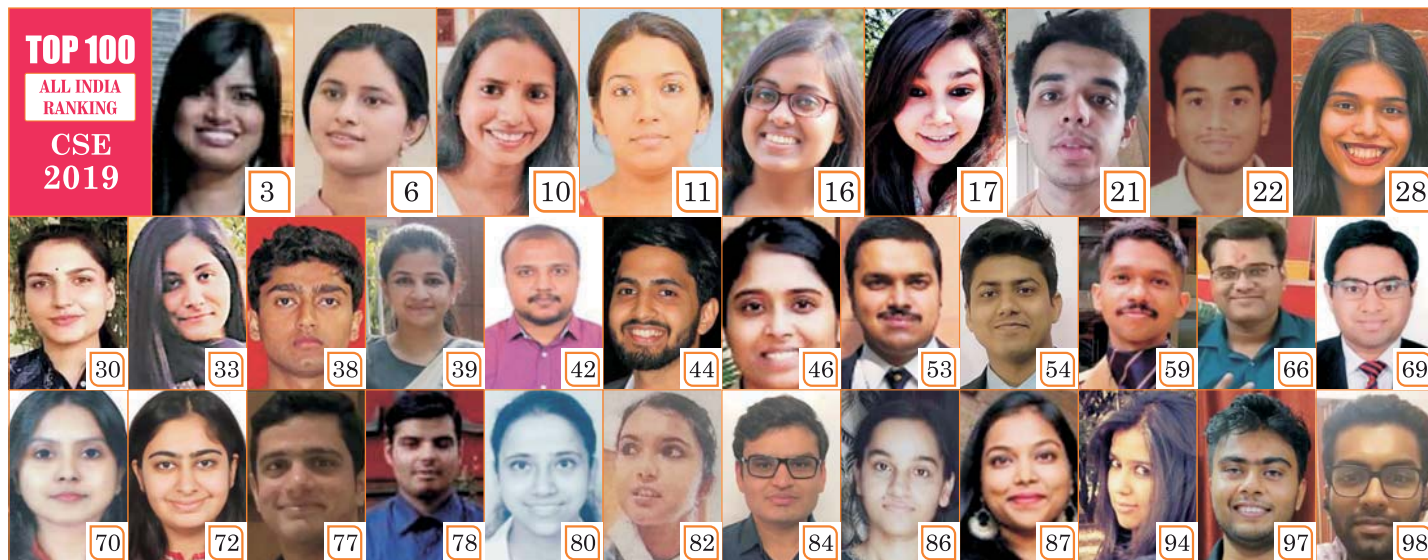
ABHYAS HIGH-SPEED EXPENDABLE AERIAL TARGET (HEAT)

⊙ **CONTEXT:** The Defence Research and Development Organisation (DRDO) conducted successful flight-tests of the indigenously-designed Abhyas High-speed Expendable Aerial Target (HEAT) in Balasore.

⊙ **ABOUT:**
- Abhyas High-speed Expendable Aerial Target (HEAT) is a drone (UAV) that will be used as a target for various missile systems.
- Abhyas is capable of fully-autonomous flight and runs on a gas turbine engine.
- Its inertial navigation system is based on **micro-electromechanical systems (MEMS)** and it uses a flight control computer for guidance and control.
  ◎ MEMS is a process technology used to create tiny integrated devices or systems that combine mechanical and electrical components.
- Abhyas has RCS, Visual and IR augmentation systems required for weapon practice.
- The air vehicle is launched using twin underslung boosters.

- It is powered by a small gas turbine engine and has an **Inertial Navigation System (INS)** along with a **Flight Control Computer (FCC)** for guidance and control.

- The vehicle has been programmed for fully autonomous flight. The check out of the vehicle is done using laptop- based Ground Control Station (GCS).

- It is designed and developed by the Aeronautical Development Establishment (ADE) of DRDO.

What are drones (UAV)?

- Unmanned aerial vehicle technology covers everything from the aerodynamics of the drone, materials in the manufacture of the physical UAV, to the circuit boards, chipset and software, which are the brains of the drone.

- UAV drones are equipped with different state of the art technology such as infrared cameras, GPS and laser (consumer, commercial and military UAV).

- Drones are controlled by remote ground control systems (GSC) and also referred to as a ground cockpit.

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GS SCORE
An Institute for Civil Services

CSE RESULTS

TOP 100 ALL INDIA RANKING — CSE 2019
3, 6, 10, 11, 16, 17, 21, 22, 28, 30, 33, 38, 39, 42, 44, 46, 53, 54, 59, 66, 69, 70, 72, 77, 78, 80, 82, 84, 86, 87, 94, 97, 98

SUCCESS IS A PRACTICE WE DO!

TOP 100 ALL INDIA RANKING — CSE 2018
2, 3, 5, 7, 27, 36, 37, 40, 44, 49, 51, 52, 56, 58, 62, 74, 81, 89, 92, 94, 98, 100

TOP 100 ALL INDIA RANKING — CSE 2017
3, 10, 19, 31, 33, 35, 40, 41, 44, 45, 48, 97, 100, 54, 57, 63, 64, 68, 71, 75, 77, 80, 83, 93

TOP 100 ALL INDIA RANKING — CSE 2016
5, 6, 9, 15, 26, 29, 43, 48, 53, 59, 67

TOP 100 ALL INDIA RANKING — CSE 2015
9, 13, 26, 34, 39, 75, 77, 78, 89, 91