

Safety for Children online**Why in News?**

- In early February, Meta CEO Mark Zuckerberg provided a public apology to parents whose children were victims of online predators during a Congressional hearing.
- The Big Tech and the Online Child Sexual Exploitation Crisis hearing was reportedly called to examine and investigate the plague of online child sexual exploitation.
- All their executives were pinned on their abdication of responsibility to protect children on social media platforms.

News Summary: Safety for children online**What are the issues with children's safety online?**

- Challenges
 - Exposure to Inappropriate Content
 - Children may come across inappropriate content such as violence, pornography, hate speech, etc. while browsing the internet.
 - Online Predators and Grooming
 - There is a risk of children encountering online predators who use social media and gaming platforms to establish relationships with children.

They can use this relationship to groom them for exploitation or abuse.

- Cyberbullying
 - Children can become victims of cyberbullying, which involves the use of digital technology to harass, intimidate, or humiliate others.
 - This can have serious psychological and emotional consequences for children.
- Privacy Concerns
 - Children may not fully understand the importance of privacy settings and may unknowingly share personal information online.
- Addictive Behaviour
 - Excessive screen time and use of digital devices can lead to addictive behaviour among children.
 - This will affect their mental and physical health, as well as their academic performance and social interactions.
- Responsibility of tech companies
 - Vast amounts of data, including about non-verbal behaviour are collected by the tech companies.
 - This allows them to facilitate hyper-personalised profiling, advertising, and increased surveillance, impacting children's privacy, security, other rights and freedom.
 - Across the world, parents and activists are aggressively advancing the agenda of having the tech companies take responsibility, or provide platforms that are safe by design for children and young users.

Reach of generative AI

- Generative AI brings potential opportunities, such as homework assistance, easy-to-understand explanations of difficult concepts, and personalised learning experiences.
 - Generative AI is a type of artificial intelligence technology that can produce various types of content, including text, imagery, audio and synthetic data.
- For children with disabilities, a world opens up as they can interface and co-create with digital systems in new ways through text, speech or images.
- But generative AI could also be used by bad actors or inadvertently cause harm or society-wide disruptions at the cost of children's prospects and well-being.
 - Generative AI can quickly make text-based lies that look just like those written by people. These lies can be more convincing than what humans write.
 - AI-generated images are sometimes indistinguishable from reality.
 - Children are vulnerable to the risks of mis/disinformation as their cognitive capacities are still developing.
 - There is also a debate about how interacting with chatbots that have a human-like tone will impact young minds.

What can be done to keep children safe online?

- Increased responsibility of tech companies
 - The primary responsibility is that of the tech companies who will have to incorporate safety by design.
 - The proceedings of the Congressional hearings have made it obvious that these companies are fully cognisant of the extent to which their apps and systems impact children negatively.
- UNICEF's Guidance for Child-Friendly AI
 - Children's Development and Well-being - UNICEF suggests that AI should support children's growth and happiness.
 - Protecting Children's Data and Privacy - According to UNICEF, AI should safeguard children's information and privacy.
 - Highest Data Protection Standards - UNICEF recommends applying the strictest data protection rules to children's data in virtual worlds and metaverse environments.
- Government Responsibilities for Children's Online Safety
 - Regulatory Frameworks Oversight - Governments must regularly check and change rules to make sure new technologies don't harm children's rights.
 - Addressing Harmful Content and Behaviour - Governments should take action against harmful content and behaviours that are bad for children online.
- Responsibilities of parents
 - Use an internet security suite
 - Use parental controls
 - Teach kids about privacy
 - Monitor what your kids post online
 - Create rules such as which websites they can visit and how long they can spend online.
 - Report online abuse

SCIENCE & TECHNOLOGY**High Altitude Pseudo satellite (HAPS)****Why in the News?**

- CSIR-National Aerospace Laboratories (NAL) has successfully tested an unmanned aerial vehicle, called High Altitude Pseudo Satellite (HAPS) at Challakere, Karnataka, earlier this month.

About High Altitude Pseudo Satellite (HAPS)

- Since the 1990s, a number of initiatives have been launched worldwide to explore the potential applications of High Altitude Pseudo Satellites, also called High Altitude Platform Stations (HAPS).
- HAPS are aircraft positioned above 20 km altitude, in the stratosphere, for very-long-duration flights counted in months and even years.
- These unmanned aircraft may be airplanes, airships or balloons.

Benefits/Advantages of HAPS

- These solar-powered vehicles have been designed to plug the missing link between unmanned aerial vehicles (UAVs) flying in lower altitudes and conventional satellites in space.
- The use of HAPS is considered for a variety of applications such as:
 - telecommunications,
 - emergency/public safety communications,
 - intelligent transportation systems,
 - maritime surveillance,
 - environmental monitoring,
 - land border control applications, etc.
- Compared to ground based communication networks, HAPS can cover larger areas with less interference.
- They could also help ease data transfer when used as an intermediate conduit between a satellite and ground based telecom networks.
- Unlike regular satellites that are expensive to build and launch, HAPS cost far less and are easier to launch.

Significance w.r.t. India

- In India, Hindustan Aeronautics Limited (HAL) in 2022 had announced that it is developing a “futuristic” high altitude pseudo satellite in collaboration with a start-up company.

- With a long and complex land border of about 15,000 km and a coastline of about 7,500 km, safeguarding the borders is crucial for India and necessitates varied solutions.
- Hovering at the edge of the Earth's atmosphere, HAPS can provide services towards efficient border patrolling, tracking movements deep into the enemy territory or in the deep seas with their sharp focus on one area.
- Equipped with high-definition optical and infra-red cameras, state-of-the-art sensors, these aerial platforms are suitable for round-the-clock missions, border patrolling, target tracking, maritime surveillance and navigation, and even missile detection.
- China's state-owned aerospace and defense conglomerate, Aviation Industry Corporation of China (AVIC), has been working on varied HAPS platforms for surveillance purposes.
 - In 2018, it successfully tested its solar-powered Morning Star drone which can reportedly stay airborne for months.

News Summary

- National Aerospace Laboratories (NAL) has successfully tested an unmanned aerial vehicle, called High Altitude Pseudo Satellite (HAPS) at Challakere, Karnataka, earlier this month.
- The 5-metre-long system, with a wingspan of 11 metres and weighing 23 kg, rose to about 3 km and stayed put for about eight hours.
- A series of tests have been planned and they are expected to culminate in a full-bodied craft – with a wingspan of 30m (nearly as much as a Boeing 737) – by 2027.
- It will be able to rise to 23 km and stay airborne for at least 90 days.
- NAL aims to design and build the HAPS' propellers, battery management system, carbon-composite airframe, flight-control system, and the high-powered electric motors that can withstand extreme temperature ranges.
- Last month, in an unrelated project, a Bengaluru-based private company carried out the first test-flight of a solar-powered, long-endurance drone that flew for 21 hours.

PRELIM FACTS

1. Kilkari Programme

- Recently the union Ministers of State for Health and Family Welfare virtually launched the Kilkari programme, a Mobile Health (m-health) initiative for beneficiaries in local content in Gujarat and Maharashtra.

About Kilkari programme:

- 'Kilkari' (meaning 'a baby's gurgle'), is a centralized interactive voice response (IVR) based mobile health service.
- Features
 - It delivers free, weekly, time-appropriate 72 audio messages about pregnancy, childbirth, and childcare directly to families' mobile phones from the second trimester of pregnancy until the child is one year old.
 - Women who are registered in Reproductive Child Health (RCH) portal based on the woman's LMP (last menstrual period) or the child's DoB (Date of Birth), receive a weekly call with pre-recorded audio content directly to the mobile phones of pregnant women and mothers with children under the age of one year.
 - Kilkari audio messages are present in the form of the voice of a fictitious doctor character called Dr. Anita.
- It is centrally hosted by the Ministry of Health and Family Welfare (MoHFW) for all the States/UTs and no further investment in the technology, telephony infrastructure or operational costs is required to be borne by States/UTs.
- This service is FREE of cost for States/UTs and beneficiaries.
- The programme is integrated with the centralized Reproductive Child Health (RCH) portal of MoHFW's and is the single source of information for this mHealth service.
- Currently Kilkari is under implementation in 18 States / UTs of India.

What is Mobile Academy?

- It is a free audio training course designed to expand and refresh the knowledge of Accredited Social Health Activists (ASHAs) and improve their communication skills via their mobile phones, which is both cost-effective and efficient.
- It is an anytime, anywhere training course that can train thousands of ASHAs simultaneously via mobile phone.

- It is operational in 17 States/UTs except Chandigarh with six languages viz. Hindi, Bhojpuri, Oriya, Assamese, Bengali & Telugu versions.

2. Mxenes

- Researchers recently reported on the potential of using MXene coatings that can guide microwaves in space and lighten satellite payloads.

About Mxenes:

- Mxenes, first discovered in 2011, are ceramics that comprise one of the largest families of two-dimensional (2D) materials.
- Unlike most 2D ceramics, MXenes have inherently good conductivity and excellent volumetric capacitance because they are molecular sheets made from the carbides and nitrides of transition metals like titanium.
- They are made from a bulk crystal called MAX.
- They have the general formula of $M_{n+1}X_nT_x$, where M is an early transition metal, X is carbon and/or nitrogen, and T is a functional group on the surface of an MXene (typically O, OH, and F).
- Among various types of MXenes, titanium carbide ($Ti_3C_2T_x$) is the most widely used.
- Some potential applications of MXenes include energy storage (such as lithium-ion batteries and supercapacitors) due to their high conductivity and large surface area, electromagnetic interference shielding, catalysis, sensors, and water purification, among others.

What are Transition Metals?

- A transition metal is any of various chemical elements that have valence electrons—i.e., electrons that can participate in the formation of chemical bonds—in two shells instead of only one.
- They occupy the middle portions of the long periods of the periodic table of elements between the groups on the left-hand side and the groups on the right.
- Compared to other metals, transition metals have high melting points and densities, and they (and their compounds) can act as catalysts.
- They are good conductors of heat and electricity.
- Many transition metals are technologically important, including titanium, iron, nickel, and copper.
- The most abundant transition metal in Earth's solid crust is iron.

3. Gas flaring

- Recently, natural gas flare samples collected by aircraft in the USA regions revealed high variation in nitrogen oxides emission estimates.

About Gas flaring:

- It is the burning of the natural gas associated with oil extraction.
- Why is gas flared?
 - Flaring persists to this day because it is a relatively safe, though wasteful and polluting, method of disposing of the associated gas that comes from oil production.
 - Utilizing associated gas often requires economically viable markets for companies to make the investments necessary to capture, transport, process, and sell the gas.
 - Firms usually resort to flaring when they lack adequate infrastructure or financial incentives to bring the gas to market, or when it needs to be released for safety reasons to manage changes in pressure during crude oil extraction.
- Most flared gas, primarily associated gas, is very similar to the natural gas used worldwide for power generation, as feedstock for the manufacture of chemicals, distributed to homes, etc.
- However, it may require processing to remove contaminants before it can be used.
- Associated gas can also be used on-site for generating electricity, compressed or liquefied for transportation as compressed natural gas (CNG) or liquefied natural gas (LNG) respectively, or converted into liquid form (e.g., synthetic oil, diesel, methanol, DME) by using gas-to-liquid (GTL) technologies.
- Impacts on environment
 - The flare's combustion converts hydrocarbons to carbon dioxide and water, which lessens the climate impact and reduces the safety concerns of the natural gas on site but also produces nitrogen oxides, or NO_x.
 - NO_x—which includes the highly reactive gases nitric oxide and nitrogen dioxide—directly and indirectly impacts air quality.

- How to reduce gas flaring? Oil producers can either re-inject associated gas or use it for productive purposes.

What is associated gas?

- It is a by-product of oil extraction and often considered a waste product if there is not an easily accessible gas market. However, associated gas can be used in several productive ways, including to generate electricity.
- Its composition can vary widely at different locations, from almost pure methane with some ethane, to gas that also contains heavier hydrocarbons like propane and butane.

4. Support to Students for participating in Competitions Abroad (SSPCA) Initiative

- The All India Council for Technical Education (AICTE) recently introduced a scheme named 'Support to Students for Participating in Competitions Abroad' (SSPCA).

About Support to Students for Participating in Competitions Abroad (SSPCA) Initiative:

- It is an initiative of the All India Council for Technical Education (AICTE) aimed at bolstering the global competitiveness of Indian students in technical education.
- It is designed to financially support students aspiring to compete in international scientific events.
- Financial Assistance and Mentorship:
 - Under the SSPCA scheme, individual students or student teams are eligible to receive travel grants to partake in international competitions.
 - The assistance encompasses financial aid, mentorship, logistical support, and networking opportunities, enabling students to represent India on a global platform effectively.
 - Financial aid provided by the AICTE scheme reaches up to Rs 2 lakh per student, covering various expenses like international and domestic travel, registration fees, visa applications, accommodation, airport taxes, travel insurance, and equipment costs related to the competition.
- Eligibility:
 - Eligibility extends to students enrolled in diploma, BE/BTech, integrated MTech, and ME/MTech programs in AICTE-approved institutions.
 - Each team of students is eligible for financial support under the scheme once during their course of study.

What is All India Council for Technical Education (AICTE)?

- It is the statutory body and the national-level council for technical education in the country.
- It was set up in 1945 as an advisory body and later, in 1987, given statutory status by an Act of Parliament.
- Functions:
 - It grants approval for starting new technical institutions, for the introduction of new courses, and for variations in intake capacity in technical institutions.
 - The AICTE has delegated to the concerned state governments powers to process and grant approval for new institutions, starting new courses and variations in the intake capacity for diploma-level technical institutions.
 - It also lays down norms and standards for such institutions.
 - It also ensures the quality development of technical education through the accreditation of technical institutions or programmes.
 - In addition to its regulatory role, the AICTE also has a promotional role, which it implements through schemes for promoting technical education for women, handicapped, and weaker sections of society promoting innovations, faculty, research and development, and giving grants to technical institutions.
- The technical institutions under the AICTE include post-graduate, under-graduate, and diploma programs in the whole spectrum of technical education, covering engineering/technology, pharmacy, architecture, hotel management and catering technology, management studies, computer applications, and applied arts and crafts.
- The AICTE has its headquarters in New Delhi.

5. Ajanta and Ellora Caves

- The Ministry of Tourism recently included the UNESCO World Heritage sites of Ajanta and Ellora caves in Chhatrapati Sambhajanagar in its Swadesh Darshan Scheme II.

About Ajanta and Ellora Caves:

- Ajanta and Ellora caves, considered to be one of the finest examples of ancient rock-cut caves, are located near Aurangabad in Maharashtra.
- The Ajanta and Ellora cave complex is adorned with beautiful sculptures, paintings, and frescoes and includes Buddhist monasteries, Hindu and Jain temples.
- The Ajanta caves are 29 in number and were built between the 2nd century BC and the 6th century AD, whereas the Ellora caves are more spread out and 34 in number and date to the period between the 6th and 11th Centuries AD.
- Ajanta Caves are mostly Buddhist sites and were used as a retreat by Buddhist monks.
 - The caves consisted of cells for meditation, assembly halls for discussions, and stupas for rituals.
- Ellora has a better mix of Hindu, Jain, and Buddhist structures.
- The caves are adorned with sculptures that reflect the spiritual beliefs of the time.
 - The sculptures range from depictions of deities, celestial beings, and mythological scenes to portraits of royalty and everyday life.
- The Kailash Temple in Ellora is an architectural marvel. It is one of the largest monolithic structures in the world.
 - The structure is carved vertically from a single rock. It took 18 years to carve out the temple.
- They are designated as UNESCO World Heritage Sites.

Key Facts about Swadesh Darshan Scheme:

- It was launched in 2015 by the Ministry of Tourism, Government of India, to develop sustainable and responsible tourism destinations in the country.
- It is 100% centrally funded scheme.
- Under the scheme, the Ministry of Tourism provides financial assistance to State governments, Union Territory Administrations, or Central Agencies for development of tourism infrastructure in the country.
- Operation & Maintenance (O&M) of the projects sanctioned under the Swadesh Darshan Scheme is the responsibility of the respective State Government/UT Administration.
- Swadesh Darshan 2.0:
 - The Ministry of Tourism has revamped its Swadesh Darshan scheme as Swadesh Darshan 2.0 (SD2.0) for the development of sustainable and responsible tourist destinations, covering tourism and allied infrastructure, tourism services, human capital development, destination management, and promotion, backed by policy and institutional reforms.
 - The objective of the Swadesh Darshan 2.0 scheme envisages increase in private sector investment in tourism and hospitality.
 - It may help in increasing Public Private Partnerships (PPP) in the field of tourism and operation and maintenance of the assets created under the scheme.

ANSWER WRITING

Q. What are the key challenges faced by Indian Railways in terms of capacity constraints and modernization? How can these challenges be addressed?

Answer: From its humble beginnings in 1853, Indian Railways has witnessed a remarkable journey. Its growth has been synonymous with India's evolving economy, playing a pivotal role in transporting goods, fostering trade, etc. Despite its crucial role, Indian Railways faces several challenges that hinder its optimal performance and growth.

Challenges in Terms of Capacity Constraints:

- Saturation on Key Routes: Major arteries like Delhi-Mumbai face exceeding passenger and freight capacity, causing overcrowding, delays, and safety concerns.
- Infrastructure Bottlenecks: Single tracks, limited sidings, and outdated signaling systems restrict network efficiency.
- Locomotive and Wagon Shortage: Aging fleet and insufficient replacements cause delays and limit expansion.
- Financial Constraints: Limited budgetary allocations restrict modernization and expansion.
- Urban Congestion: Growing city populations strain suburban railway networks, leading to travel chaos in metropolitan areas like Mumbai.

Challenges in Terms of Modernization:

- Aging Infrastructure: Decades-old tracks, signaling systems, and rolling stock lack efficiency, leading to delays and safety concerns.

- **Financial Constraints:** Limited government funding hampers critical upgrades like high-speed rail and station modernization.
- **Operational Inefficiencies:** Complex bureaucracy and rigid labor regulations hinder operational efficiency and timely decision-making.
- **Competition from Other Modes:** Rising competition from road transport and airlines challenges both passenger and freight segments.
- **Safety Concerns:** Level crossings, trespassing, and outdated safety measures contribute to accidents and fatalities.

Addressing capacity constraints and modernization challenges of Indian Railways:

- **Decongesting India's Existing Network:**
 - **Dedicated Freight Corridors (DFC):** projects, initiated in 2004, gained momentum post-2009 with World Bank participation, aiming to revolutionize the freight sector.
 - **High-Speed Operations:** Instead of costly high-speed projects, the focus now is on removing bottlenecks in existing infrastructure. Ex: Rail Over Bridges, Rail Under Bridges, and signal automation on high-capacity routes, like Delhi–Mumbai and Delhi–Kolkata.
- **Unlocking Technical Capabilities:**
 - **Alstom LHB Coaches:** a slow increase in LHB coach production.
 - **Vande Bharata Express:** The project's potential can be enhanced by increasing routes.
 - **Effective Networking and Diplomacy:** India joined the International Union of Railways to leverage technical capabilities and effective networking.
- **Public-private partnerships and technology:**
 - Involving private entities in station redevelopment like Habibganj station, Bhopal, for faster upgrades and revenue generation.
 - Implementing e-ticketing, dynamic fare pricing, and AI-powered route optimization to manage demand and improve operational efficiency
 - **KAVACH**, an indigenously developed Automatic Train Protection poised to reduce rail accidents.

India's railway modernization faces hurdles due to inconsistent political and policy support. The rigid approach, outdated experiences, and inadequate competition with global rail systems hinder progress. Addressing political, policy, and technological challenges as envisaged by Sam Pitroda Committee recommendations is imperative for achieving high-speed rail ambitions.

MCQs

1. Consider the following statements with reference to High Altitude Pseudo Satellites (HAPS):
 1. These are unmanned air vehicles that can fly at altitudes of 18-20 km from the ground and can hold fixed positions.
 2. These could be airplanes, airships, balloons, etc.

Which of the statements given above is/are correct?

(a) 1 only
(b) 2 only
(c) **Both 1 and 2**
(d) Neither 1 nor 2
2. Consider the following statements with reference to the Science for Women-A Technology & Innovation (SWATI) Portal:
 1. It has been launched by the Ministry of Science and Technology.
 2. The portal will be maintained by the National Institute of Plant Genome Research.
 3. It will create a single online portal representing Indian Women and Girls in STEMM (Science, Technology, Engineering, Mathematics & Medicine)

How many of the statements given above are correct?

(a) Only one
(b) **Only two**
(c) All three
(d) None
3. The term "Brumation" recently seen in the news is related to which one of the following?

(a) **Winter dormancy in reptiles**
(b) Dormancy induced by the heat and dryness of summer
(c) Purification of saline water
(d) Existence of life on the Moon
4. Consider the following statements with reference to the Prime Minister Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi) Scheme:
 1. It was launched by the Ministry of Housing and Urban Affairs (MoHUA).
 2. The scheme will facilitate collateral-free working capital loans up to ₹10,000 for a tenure of one year.
 3. State or Urban Local Bodies are responsible for the identification of eligible street vendors.

- How many of the statements given above are correct?
- (a) Only one
(b) Only two
(c) **All three**
(d) None
5. Consider the following statements with reference to the El Nino Southern Oscillation (ENSO):
1. During El Nino, temperatures are lower than normal over eastern and central parts of the equatorial Pacific Ocean.
 2. During La Nina, temperatures are higher than normal over eastern and central parts of the equatorial Pacific Ocean.
- Which of the statements given above are incorrect?
- (a) 1 only
(b) 2 only
(c) **Both 1 and 2**
(d) Neither 1 nor 2
6. Consider the following statements.
1. In India, the Constitution gives the government the right to levy taxes on individuals and organisations.
 2. As per the Seventh Schedule of the Constitution, Union and the States have concurrent power of taxation.
 3. In India, any tax being charged has to be backed by a law passed by the state legislature or Parliament.
- How many of the above statements is/are correct?
- (a) Only one
(b) **Only two**
(c) All three
(d) None
7. With reference to the Uniform Civil Code (UCC), consider the following statements:
1. The concept of a Uniform Civil Code (UCC) in India draws inspiration from Right to Equality.
 2. After the implementation of the UCC in India, issues related to freedom of religious expression and worship will easily be addressed.
 3. Implementing UCC would promoting social equality by removing differences in the law based on religion.
- How many of the statements given above are correct?
- (a) Only one
(b) **Only two**
(c) All three
(d) None
8. Consider the following statements:
1. Hematite iron ore is often associated with sedimentary rocks.
 2. Iron ore pellets are small, hard, spherical particles made from fine iron ore concentrate.
 3. Sponge iron refers to a type of cast iron with high carbon content and brittle properties.
- How many of the statements given above are correct?
- (a) Only one
(b) **Only two**
(c) All three
(d) None
9. Consider the following statements regarding the Apollo Species of Butterflies:
1. Dusted Apollo Butterfly is known for its distinctive wing patterns and coloration.
 2. All species of the Apollo butterfly are migratory, travelling long distances between seasons.
 3. They are highly valued butterflies in commercial trade.
- Which of the statements given above are correct?
- (a) 1 and 2 only
(b) 2 and 3 only
(c) **1 and 3 only**
(d) 1, 2 and 3
10. Cygnus X-1, seen in the news recently, is classified as a:
- (a) **Black hole**
(b) Neutron star
(c) White dwarf
(d) Supernova remnant