

SCIENCE AND TECHNOLOGY/CYBER SECURITY

❖ **Why is WhatsApp threatening to leave U.K.?**

➤ **CONTEXT:** During a visit to the U.K. recently, WhatsApp's head Will Cathcart said that WhatsApp would not comply with the country's proposed Online Safety Bill (OSB) which will in effect outlaw end-to-end (E2E) encryption. Mr. Cathcart said that it was the first time a "liberal democracy" was attempting to block a "secure product".

➤ **What is end-to-end encryption?**

- E2E encryption ensures that a message can only be decrypted by the intended recipient using a secure decryption key that is unique to each sender-recipient pair and to each of their messages.
- Decryption, even by the messaging service provider, is impossible. Even if the platform's servers are compromised, without the intended recipient's decryption key, only a garbled string of characters will be available.
- Over the last few years, E2E encryption has been steadily gaining ground. It is offered by default on WhatsApp, Signal, Apple's iMessage and FaceTime and is an option on Meta's Messenger and Telegram.

➤ **What is the Online Safety Bill?**

- The Online Safety Bill is a proposed British legislation that seeks to improve online safety by placing certain "duty of care" obligations on online platforms.
- Most of the criticism is directed against clause 110 of the OSB which empowers the British telecommunications regulator, the Office of Communications, to issue notices to most kinds of internet service providers, including private messaging apps and search engines, to identify and take down terrorism content that is communicated "publicly" and Child Sex Exploitation and Abuse (CSEA) content that is communicated "publicly or privately", and to prevent such content from being communicated in the first place.
- Although the OSB does not mandate removal of E2E encryption, it would de facto mean breaking it as messaging apps would have to scan all messages that are sent on their platform to flag and take down terrorist and CSEA content.
- Since the clause also requires the platforms to "prevent" terrorism and CSEA content from being communicated using the platforms, it would mean that WhatsApp would have to implement a client-side scanning mechanism to scan content on users' devices before it is even encrypted. For this, they would need to rely on algorithms that are not very sophisticated and do not understand context.
- For instance, in 2021, Google automatically blocked a father's account in San Francisco and reported him to the local police because he had shot videos of his toddler son's infection in intimate areas to share with his son's doctor during the pandemic.
- Privacy and free speech advocates, as well as multiple members of the British Parliament, view this Bill as a disproportionate step that allows the state to mandate bulk interception and surveillance.

➤ **What if the platforms don't comply?**

- If platforms do not comply, they may face penalties of up to £18 million or 10% of the platform's global revenue of the preceding accounting year, whichever is higher. Currently, the Bill has been passed by the House of Commons and a House of Lords committee is examining the Bill. Once the committee's report is ready, it will go back to House of Lords for a third reading.

➤ **Did India enact a similar law?**

- Through the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, the Indian government made it mandatory for messaging platforms with more than five million users in India to "enable the identification of the first originator" of a message, or what is commonly called traceability. This is not the same as asking for scanning and flagging of all encrypted content; it is about getting to the first person who sent a message that may have been forwarded multiple times.
- In India, WhatsApp did not threaten to leave the market. It instead, sued the Indian government over the traceability requirement. This is mainly because India, with 487.5 million WhatsApp users, is home to 22% of the platform's 2.24 billion monthly active users. WhatsApp's penetration rate in India is over 97% while in the U.K., it is at about 75%. Moreover, the U.K., with 40.4 million users accounts for little less than 2% of global users. Even Mr. Cathcart said it would be "an odd choice" to compromise the app's security for just 2% of its user base.

WASTE MANAGEMENT

❖ **Why do landfills catch fire during summers?**

➤ **CONTEXT:** The Kochi landfill site around Brahmapuram that caught fire earlier this month (May 2023) is a stark reminder that Indian cities need to be prepared for more such incidents as summer approaches. Preventing such fires require long-term measures, including thorough and sustained interventions from municipalities.

➤ **How do landfills catch fire?**

- India's municipalities have been collecting more than 95% of the waste generated in cities but the efficiency of waste-processing is 30-40% at best.
- Municipal solid waste consists of about 60% biodegradable material, 25% non-biodegradable material and 15% inert materials, like silt and stone.

- Municipalities are expected to process the wet and dry waste separately and to have the recovered by-products recycled. Unfortunately, the rate of processing in India's cities is far lower than the rate of waste generation, so unprocessed waste remains in open landfills for long periods of time.
- This openly disposed waste includes flammable material like low-quality plastics, which have a relatively higher calorific value of about 2,500-3,000 kcal/kg, and rags and clothes.
- In summer, the biodegradable fraction composts much faster, increasing the temperature of the heap to beyond 70-80°C. A higher temperature coupled with flammable materials is the perfect situation for a landfill to catch fire. Some fires go on for months.
- **Is there a permanent solution?**
- There are two possible permanent solutions to manage landfill fires.
- ✓ The first solution is to completely cap the material using soil, and close landfills in a scientific manner. This solution is unsuitable in the Indian context, as the land can't be used again for other purposes. Closed landfills have specific standard operating procedures, including managing the methane emissions.
- ✓ The second solution is to clear the piles of waste through bioremediation — excavate old waste and use automated sieving machines to segregate the flammable refuse-derived fuel (RDF) (plastics, rags, clothes, etc.) from biodegradable material. The recovered RDF can be sent to cement kilns as fuel, while the bio-soil can be distributed to farmers to enrich soil. The inert fraction will have to be landfilled. However, implementing a bioremediation project usually takes up to two or three years, necessitating a short-term solution for summertime landfill fires.
- **What are some immediate measures?**
- Landfill sites span 20-30 acres and have different kinds of waste. The first immediate action is to divide a site into blocks depending on the nature of the waste. At each site, blocks with fresh waste should be separated from blocks with flammable material. Blocks that have been capped using soil are less likely to catch fire, so portions like these should also be separated out. The different blocks should ideally be separated using a drain or soil bund and a layer of soil should cap each block. This reduces the chance of fires spreading across blocks within the same landfill.
- Next, the most vulnerable part of the landfill (the portion with lots of plastics and cloth) should be capped with soil. The fresh-waste block shouldn't be capped but enough moisture should be provided by sprinkling water and the material should be turned regularly for aeration, which helps cool the waste heap. Once a site has been divided into blocks, the landfill operator should classify incoming waste on arrival to the site, and dispose them in designated blocks rather than dumping mixed fractions. Already segregated non-recyclable and non-biodegradable waste should be sent to cement kilns instead of being allowed to accumulate. Dry grass material and dry trees from the site should also be cleared immediately.
- While these measures can help reduce the fires' damage, they're far from ideal and not long-term solutions. The permanent and essential solution is to ensure cities have a systematic waste-processing system where wet and dry waste is processed separately and their byproducts treated accordingly.

PRELIMS

1. Pradhan Mantri PVTG (Particularly Vulnerable Tribal Groups) Development Mission

➤ **CONTEXT:** After Finance Minister Nirmala Sitharaman announced a ₹15,000-crore expenditure outlay for the Prime Minister's Particularly Vulnerable Tribal Groups (PM-PVTG) Development Mission, the Standing Committee on Social Justice and Empowerment on recently expressed disappointment that such a massive budgetary allocation had been planned when even the Ministry of Tribal Affairs does not have data on PVTG populations in several States and Union Territories.

➤ **About the Mission**

- A fund of Rs 15,000 crore for the next three years has been allocated for the socio-economic development of the group.
- It will be launched as part of 'Reaching The Last Mile', one of the seven Saptarishi priorities enlisted in Budget 2023.
- The PVTGs Mission aims to provide basic facilities like housing, water, road, telecom, education and health in PVTG areas across the country.
- ✓ The scheme follows the strategic approach of Vanbandhu Kalyan Yojana, which is need-based and strives to optimise utilisation of resources available under various programs and aims at specific outcomes.
- Implementation: Among the ministries that are expected to be roped in to implement the PM-PVTG Mission the Rural Development Ministry, the Water Resources Ministry, the Education Ministry, the Health Ministry and the Women and Child Development Ministry.

➤ **Need for Special Support**

- Due to their vulnerability, PVTGs require greater support and development compared to other tribal groups.
- The more developed and assertive tribal groups often receive a larger portion of tribal development funds, leaving PVTGs in need of more targeted support.
- The programme for the welfare of PVTGs began in the 1970s and there is an absence of a proper policy that considers their culture, practices, livelihood and other aspects of their lives for their welfare.

- **Who are Particularly Vulnerable Tribal Groups (PVTGs)?**
 - The Particularly Vulnerable Tribal Groups (PVTGs) are those that depend on hunting for food, have pre-agriculture level technologies, zero or negative population growth, and extremely low levels of literacy and are in need of greater support and development.
 - Background: On the recommendation of the Dhebar Commission, the Central government began to identify the most vulnerable tribal groups as a separate category in 1975, establishing 52 such groups.
 - ✓ The list was expanded in 1993, when another 23 groups were added, for a total of 75 PVTGs out of 705 Scheduled Tribes spread across 17 states and one Union Territory (UT) in the country (2011 census), the highest number being found in Odisha.
 - **Criteria for identification of PVTGs:**
 - ✓ Pre-agricultural level of technology
 - ✓ Low level of literacy
 - ✓ Economic backwardness
 - ✓ A declining or stagnant population.

2. Delhi ranks 4 on list of world's most polluted cities

- **CONTEXT: Delhi ranked fourth on a list of 50 of the world's most polluted cities in terms of PM2.5 levels in 2022, according to the World Air Quality Report prepared by IQAir.**

- Delhi had an average PM2.5 level of 92.6 µg/m3 in 2022, a little below the average of 96.4 µg/m3 in 2021.

- The most polluted city in the world was found to be Lahore, followed by Hotan in China, and Bhiwadi in Rajasthan, according to the report.

- The average PM2.5 concentration in Bhiwadi was 92.7 µg/m3. Delhi has retained its ranking on this list – it stood fourth in 2021 as well. The WHO guideline for annual PM2.5 levels is 5 µg/m3.

- The report makes a distinction between New Delhi and Delhi, with New Delhi having an annual average PM2.5 level of 89.1 µg/m3. New Delhi is the second most polluted capital city in the world. This is on a list of

TOP 10 MOST POLLUTED COUNTRIES, 2022 INDIA'S RANK FALLS TO #8 FROM #5		
1	Chad	89.7
2	Iraq	80.1
3	Pakistan	70.9
4	Bahrain	66.6
5	Bangladesh	65.8
6	Burkina Faso	63.0
7	Kuwait	55.8
8	India	53.3
9	Egypt	46.5
10	Tajikistan	46.0

Population weighted, 2022 average PM2.5 concentration (µg/m³) for countries, regions, and territories in descending order
Source: World Air Quality Report, 2022

- 116 capital cities, with N'Djamena in Chad topping this list with only a marginally higher PM2.5 level of 89.7 µg/m3. Over the past four years, Delhi has topped the IQAir list of most polluted capital cities.

- A total of 39 Indian cities (including 'Delhi' and 'New Delhi') are on the list of 50 of the world's most polluted cities based on annual average PM2.5 levels in 2022. These include cities like Noida, Gurgaon, Bulandshahr, Meerut, Charkhi Dadri, Jind, Ghaziabad, Faridabad, and Greater Noida.

- Delhi's annual average PM2.5 level in 2020 was 84 µg/m3, and 98.6 µg/m3 in 2019, according to IQAir. In 2022, Delhi's average PM2.5 level was found to be highest in November.

- Out of 131 countries, India ranked eighth with a population weighted average PM2.5 level of 53.3 µg/m3 in 2022. India is behind Chad, Iraq, Pakistan, Bahrain, Bangladesh, Burkina Faso and Kuwait on this list. The annual average for the country in 2022 was a little lower than the 58.1 µg/m3 recorded in 2021.

- IQAir is a Swiss air quality technology company that prepares annual world air quality reports based on data from monitoring stations operated by governments and other institutions and organisations across the world. The 2022 report is based on PM2.5 data from 7,323 cities and 131 countries.

3. Ex Bold Kurukshetra 2023

- **CONTEXT: The Singapore Army and Indian Army participated in the 13th edition of Exercise Bold Kurukshetra, a bilateral armour exercise at Jodhpur Military Station, India.**

- For the first time in the exercise series, both armies participated in a command post Exercise, which involved Battalion and Brigade level planning elements and computer wargaming.

- Hosted by the Indian Army, the exercise involved soldiers from the 42nd Battalion, Singapore Armoured Regiment and an Armoured Brigade of Indian Army.

- The ten-day long joint training fostered common understanding of mechanised warfare in emerging threats and evolving technologies, developing inter-operability through a computer simulation-based Wargame using joint operational and tactical procedures controlled through a joint command post.

- Both contingents not only learnt about each other's operating drills and procedure, but also exchanged ideas and best practices being followed in a modern combat zone.

➤ **About:**

- Exercise Bold Kurukshetra is conducted under the ambit of the bilateral arrangement for the joint Army Training and exercises between the Singapore Army and the Indian Army.
- First conducted in 2005, this exercise underscores the strong and long-standing bilateral defence relationship between both countries and enhances cooperation between the two armies.
- Both defence establishments also interact regularly through high-level visits, policy dialogues, courses and other professional exchanges.

4. Pradhan Mantri Kisan Sampada Yojana (PMKSY)

➤ **CONTEXT: The Minister of State for Food Processing Industries, in a written reply to a question in Lok Sabha informed that total fund of Rs. 4439.20 crore has been allocated for the period from 2017-18 to 2022-23 under Pradhan Mantri Kisan Sampada Yojana (PMKSY).**

- A Central Sector Scheme - SAMPADA (Scheme for Agro-Marine Processing and Development of Agro-Processing Clusters) was approved by the Cabinet Committee on Economic Affairs (CCEA) in 2017.
- This umbrella scheme has now been renamed as the "Pradhan Mantri Kisan Sampada Yojana (PMKSY)" to be implemented by Ministry of Food Processing Industries (MoFPI).
- PM Kisan SAMPADA Yojana is a comprehensive package which aims to create modern infrastructure with efficient supply chain management from farm gate to retail outlet.
- It will not only provide a big boost to the growth of food processing sector in the country but also help in providing better returns to farmers and is a big step towards doubling of farmers income, creating huge employment opportunities especially in the rural areas, reducing wastage of agricultural produce, increasing the processing level and enhancing the export of the processed foods.

➤ **Objectives**

- Creation of modern infrastructure for food processing mega food parks/ clusters and individual units
- To create effective backward and forward linkages - linking farmers, processors and markets
- To create robust supply chain infrastructure for perishables

➤ **Schemes implemented under PMKSY**

- The sub-schemes namely (i) Integrated cold chain and Value Addition Infrastructure, (ii) Creation of Infrastructure for Agro Processing Clusters, (iii) Creation/ Expansion of Food Processing and Preservation Capacities and (iv) Operation Greens of PMKSY helps in increasing processing level of the raw farm produce by reducing the loss due to perishability.
- The major steps taken/ being taken by Government of India for boosting export of processed food are implementing Agriculture Export Policy, District as Export Hubs (DEH) scheme on One District One Product (ODOP) basis, Production Linked Incentive schemes, collaboration with Missions/ Embassies, organising trade fairs and Buyer-Seller meets.

ANSWER WRITING

Q. Examine the opportunities and challenges associated with the government's push for the Indigenisation of defence production. What are the measures taken by the government to promote indigenous manufacturing of defence equipment?

Indigenisation refers to developing the capability of producing defence equipment's within the country for the purpose of achieving self-reliance and reducing the burden of imports. According to a report by Stockholm International Peace Research Institute (SIPRI) despite an 11 percent drop in its arms import between 2013-17 and 2018-22, India remained the world's largest arms importer from 2018 to 2022. Hence, an Indigenous defence industry is key for achieving self-reliance and strategic objectives.

Opportunities associated with Indigenisation of defence production:

- **Enhancing India's strategic independence:** Self-reliance in the defence industry will enhance India's strategic independence and promote development in the country's domestic defence and aerospace industry.
- **Employment generation:** Development of the defence industry will need support from various other industries (for e.g., Iron and Steel) and will lead to generation of employment opportunities.
- **Increase in exports and economic growth:** Indigenous defence production can help India to boost exports and achieve its 2025 export target of Rs. 36,500 crores. This can further help in making India a \$5 trillion economy.
- **Reduction in fiscal deficit:** As India is the largest importer of arms in the world, a greater import dependency leads to an increase in fiscal deficit. Indigenisation can help in reducing import dependency and thus reducing fiscal deficit.
- **Security against porous borders and hostile neighbours:** Given the threats emanating from the Pakistan and China on the western and eastern border respectively, achieving indigenous defence production is key to countering these threats.

Challenges associated with Indigenisation of defence production:

- The economics of the defence industry does not follow the normal rules: it is difficult to manufacture armaments in large enough numbers to benefit from economies of scale. Also, the costs per unit in the defence industry are very high.
- Highly dispersed defence production: Government policies are not adequately designed for 21st century defence production processes. This implies assembly at a single site and the centralisation of raw materials, technology, and component manufacturing. The reality is that defence production is becoming increasingly dispersed across regions and even countries.
- Policy Unpredictability: The primary element limiting India's bid for an indigenous defence industry today is policy unpredictability with respect to long-term requirements for future security scenarios.
- Procedural Complexities: Agencies involved in indigenisation continue to follow their own procedures and norms.
- Low spending on R&D: Indigenisation depends heavily on defence research and development (R&D), on which the public spending in India has consistently been quite low.

Government Initiatives in place for promoting defence indigenisation:

- According priority to procurement of capital items of the Buy Indian (Indigenously Designed, Developed and Manufactured) category from domestic sources under Defence Acquisition Procedure (DAP)-2020.
- Notification of four 'Positive Indigenisation Lists' of total 411 items of Services and three 'Positive Indigenisation Lists' of total 3,738 items of Defence Public Sector Undertakings (DPSUs).
- Simplification of make procedure and also simplification of Industrial licensing process with a longer validity period.
- Launch of Innovations for Defence Excellence (iDEX) scheme to foster innovation and technology development in Defence and Aerospace by engaging industries including MSMEs, Start-ups, Individual Innovators, R&D institutes and Academia.
- Liberalisation of Foreign Direct Investment (FDI) policy allowing 74% FDI under automatic route.
- Launch of an indigenisation portal, namely SRIJAN a one stop online portal that provides access to the vendors to take up items that can be taken up for indigenisation.
- Establishment of two Defence Industrial Corridors, one each in Uttar Pradesh and Tamil Nadu to attract investments in Aerospace & Defence sector and established a comprehensive defence manufacturing ecosystem in the country.

The Vijay Kelkar Committee in 2004 recommended encouraging the involvement of the country's best firms in defence capability building and exploring synergies in the private sector. Therefore, measures such as formulation of a National Indigenisation Plan and adopting a collaborative approach involving the public and private sectors can yield rich dividends.

MCQs

1. With reference to the End to End Encryption, consider the following statements:
 1. When data is being transferred using this technique, only the sender and recipient can decrypt it with key.
 2. The message does not pass through an intermediary server.
 3. The process of end-to-end encryption uses an algorithm that transforms standard text into an unreadable format.

Which of the statements given above is/are correct?

 - a) 1 and 2 only
 - b) 2 and 3 only
 - c) **1 and 3 only**
 - d) 1,2,3
2. With reference to the Waste-to-energy, consider the following statements:
 1. It converts municipal and industrial solid waste into electricity and/or heat for industrial processing.
 2. It is a form of energy recovery.
 3. Most Waste-to-energy processes produce electricity and/or heat directly through combustion, or produce a combustible fuel commodity, such as methane, methanol, ethanol or synthetic fuels.

Which of the above statement is/are correct?

 - a) 1 and 2 only
 - b) 2 and 3 only
 - c) 1 and 3 only
 - d) **1, 2, and 3**
3. With reference to Vanbandhu Kalyan Yojana (VKY) consider the following statements
 1. The Scheme was launched in 2023 union budget as a Central Sector Scheme by the Ministry of Tribal Affairs.
 2. The scheme aims at overall development of tribal people with an outcome-based approach, ensuring that all the intended benefits, goods and services through various programmes/schemes of Central and State Governments covered under the respective Tribal Sub-Plans actually reach them.

Which of the above statement/s is/are not correct?

 - a) **1 only**
 - b) 2 only
 - c) Both 1 and 2

- d) Neither 1 nor 2
4. With reference to AUKUS consider the following
1. It is a trilateral security pact between Australia, the United Kingdom, and the United States
 2. Under it, the U.S., U.K will help Australia deploy nuclear-powered submarines in the Pacific region

Which of the given above statements is/are correct?

- a) 1 only
 - b) 2 only
 - c) **Both 1 and 2**
 - d) Neither 1 nor 2
5. The 'SAMPADA' scheme of Government of India is related to which of the following?
- a) Rural banking
 - b) **Food processing**
 - c) Insurance for BPL families
 - d) Irrigation sector
6. Consider the following statements with reference to Exercise Bold Kurukshetra 2023
1. It is a bilateral armour exercise between Indian Army and Singapore Army
 2. For the first time in the exercise series, both armies participated in a Command Post Exercise, which involved Battalion and Brigade level planning elements and computer wargaming.
 3. The exercise involved soldiers from the 42nd Battalion, Singapore Armoured Regiment and the 27th Armoured Brigade, Indian Army.

Which of the above statement/s is/are correct?

- a) 1 and 2 only
 - b) 2 and 3 only
 - c) 1 and 3 only
 - d) **1,2 and 3**
7. 'SAHYOG' as an indicative guidance document with the essential information on the existing social security schemes collated from respective Ministries is published by which of the following ministry?
- a) **Ministry of Rural Development**
 - b) Ministry of Social Justice and Empowerment
 - c) Ministry of Home Affairs
 - d) Ministry of Finance
8. With reference to Pradhan Mantri Anusuchit Jaati Abhyuday Yojana (PM-AJAY) consider the following statements
1. Under the scheme villages having high density of Scheduled Castes (SCs) populations are taken up for holistic development.
 2. The selection criteria for villages has been recently revised in 2022-23 from 'more than 40%' SC population to 'more than 50%'.

Which of the above statement/s is/are correct?

- a) **1 only**
 - b) 2 only
 - c) Both 1 and 2
 - d) Neither 1 nor 2
9. Consider the following statements regarding 'Shanghai Cooperation Organization (SCO)':
1. Russia, China and Kazakhstan are the founding members of SCO.
 2. Pakistan and India are the permanent members of SCO.

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
10. Consider the following statements with reference to the Antiquities and Art Treasures Act, 1972
1. It defined "cultural property" as the property designated by government having "importance for archaeology, prehistory, history, literature, art or science."
 2. The act defined "antiquity" as like any coin, sculpture, painting, epigraph, craftsmanship that "has been in existence for not less than one hundred years."
 3. For "manuscript, record or other document which is of scientific, historical, literary or aesthetic value", this duration is "not less than seventy five years."

Which of the following statement/s is/are correct?

- a) 1 and 2 only
- b) **2 and 3 only**
- c) 1 and 3 only
- d) 1,2 and 3