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**WEEKLY CURRENT AFFAIRS  
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SECOND WEEK**

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**GS I: Social reformer**

# SAVITRIBAI PHULE

## 1. Context

Recently, The Prime Minister paid homage to Savitribai Phule on her birth anniversary.

## 2. Savitribai Phule (Kavya Phule, 1854)

- A Dalit woman from the Mali community, Savitribai was born on January 3, 1831, in Maharashtra's Naigaon village.
- Married off at the tender age of 10, her husband Jyotirao Phule is said to have educated her at home. Later, Jyotirao admitted Savitribai to a teachers' training institution in Pune.
- Throughout their life, the couple supported each other and in doing so, broke many social barriers.
- At a time when it was considered unacceptable for women to even attain education, the couple went on to open a school for girls in Bhidewada, Pune, in 1848.
- This became the country's first girls' school.
- A pioneer who challenged oppressive social norms in her quest for women's education, equality, and justice, Savitribai Phule is formally recognized as India's first woman teacher. The above poem titled Go, Get Education, is among the many Phule wrote to make a clarion call to the downtrodden to pursue education, and break free from the shackles of the caste system.



### 3. Phule's role as a social reformer

- Phule's work extended to many fields including the eradication of untouchability and the caste system, women's emancipation, and the reform of Hindu family life.
- Savitribai Phule started Mahila Seva Mandal in 1852, which worked for raising women's consciousness about their human rights, the dignity of life, and other social issues.
- The first ever infanticide prohibition home of India was started by Savitribai Phule in 1853.
- They championed widow remarriage and started a home for lower and upper-caste widows in 1854.
- In September 1873, Phule, along with their followers, formed the Satyashodhak Samaj (Society of Seekers of Truth) to attain equal rights for peasants and people from lower castes.
- Savitribai Phule was the first Dalit woman, in fact, the first woman whose poems got noticed in the British Empire.
- The prestigious University of Pune was renamed Savitribai Phule Pune University in 2014.
- The Government of Maharashtra has instituted an award in her name to recognize women social reformers.

#### 4. Savitribai's Literary Works

- Savitribai Phule published her first Collection of poems, called Kavya Phule (Poetry's Blossoms), at the age of 23 in 1854.
- She published Bavan Kashi Subodh Ratnakar (The Ocean of Pure Gems), in 1892.
- Besides these works, Matushri Savitribai Phlenchi Bhashane VA Gaani (Savitribai Phule's speeches and songs), and her letters to her husband have also been published.

#### GS I: Indian modern history

## ARCHEOLOGICAL SURVEY OF INDIA

### 1. Context

Fifty of India's 3,693 centrally protected monuments have gone missing, the Ministry of Culture has told Parliament.

The submissions were made by the ministry on December 8 to the Parliamentary Standing Committee on Transport, Tourism and Culture as part of a report titled 'Issues relating to Untraceable Monuments and Protection of Monuments in India'.

### 2. Archaeological Survey of India

- The ASI was founded in 1861 by Alexander Cunningham, when he realised the need for a permanent body to oversee archaeological excavations and conservation.
- But while the body remained largely dysfunctional in the 19th century owing to fund crunch, in the decades preceding Independence, it became very active.
- A bulk of the protected monuments were taken under the ASI's wings during the 1920s and 30s, up till the 50s.
- But in the decades after independence, the focus of successive governments was on health, education and infrastructure, rather than protecting heritage.

- Even within the scope of heritage, the aim was to uncover more monuments and sites, instead of conservation.

### 3. AMASR Act

- The Ancient Monuments and Archaeological Sites and Remains Act (AMASR Act) regulates the preservation of monuments and archaeological sites of national importance.
- The Archaeological Survey of India (ASI), which is under the aegis of the Union Ministry of Culture, functions under this Act.

The Act protects monuments and sites that are more than 100 years old, including temples, cemeteries, inscriptions, tombs, forts, palaces, step-wells, rock-cut caves, and even objects like cannons and mile pillars that may be of historical significance.

- According to the provisions of AMASR Act, ASI officials are supposed to regularly inspect the monuments to assess their condition.
- Apart from various conservation and preservation operations, ASI officials can also file police complaints, issue show cause notices for the removal of encroachments, and communicate to the local administration the need for demolition of encroachments.

### 4. Missing of Monuments

- So in due course, many monuments and sites were lost to activities like urbanisation, construction of dams and reservoirs, and even encroachments.

As per the ASI submission in Parliament, 14 monuments have been lost to rapid urbanisation, 12 are submerged by reservoirs/dams, while 24 are untraceable, which brings the number of missing monuments to 50.

- “Even now, we are grappling with an acute manpower shortage to physically man all the big and small monuments which may fall under a particular region”.

- The agency told the Parliamentary committee that security guards were posted at only 248 of the 3,693 monuments.
- “The committee notes with dismay that out of the total requirement of 7,000 personnel for the protection of monuments, the government could provide only 2,578 security personnel at 248 locations due to budgetary constraints,”

#### 4.1. CAG report

- A comprehensive physical survey of all monuments has never been conducted after Independence, in 2013, a Comptroller and Auditor General (CAG) report said that at least 92 centrally protected monuments across the country had gone missing.
- The CAG report said that the ASI did not have reliable information on the exact number of monuments under its protection.
- It recommended that periodic inspection of each protected monument be carried out by a suitably ranked officer.
- The Culture ministry accepted the proposal, but there was hardly any movement.
- The report notes that “out of the 92 monuments declared as missing by the CAG, 42 have been identified due to efforts made by the ASI.”
- Of the remaining 50, 26 have been accounted for, as mentioned earlier, while 24 are untraceable.

The Ministry said, “Such monuments which could not be traced on ground for a considerable time because of multiple factors, despite the strenuous efforts of ASI through its field offices, were referred as Untraceable monuments.”

#### 4.2. List of Missing Monuments

- These include 11 in Uttar Pradesh, two each in Delhi and Haryana, and in states like Assam, West Bengal, Arunachal Pradesh and Uttarakhand.

- “Many such cases pertain to inscriptions, batteries and tablets, which don’t have a fixed address. They could have been moved or damaged and it may be difficult to locate them.”
- The Parliamentary panel said it was perturbed to find that the Barakhamba Cemetery in the very heart of Delhi was among the untraceable monuments.
- “If even monuments in the Capital cannot be maintained properly, it does not bode well for monuments in remote places in the country,” it said.
- The particular cemetery may have been lost to the “redevelopment of the New Delhi Railway Station”.

Other missing monuments include

1. the Guns of Emperor Sher Shah, Tinsukia (Assam);
2. the Ruins of Copper Temple, Paya, Lohit (Arunachal Pradesh);
3. Kos Minar, Mujesar, Faridabad (Haryana); Kutumbari Temple, Dwarahat, Almora (Uttarakhand);
4. Rock Inscription, Satna (Madhya Pradesh);
5. Old European Tomb, Pune (Maharashtra);
6. 12th Century Temple, Baran (Rajasthan); and
7. Telia Nala Buddhist ruins, Varanasi (Uttar Pradesh).

## 5. Untraceable monuments

- The CAG audit included a joint physical inspection, along with the ASI, of merely 1,655 monuments out of the 3,678 on the protected list at the time.
- The 24 monuments reported to be untraceable are from this sample of 1,655 monuments.
- “The Committee is perturbed to note that having found out that at least 24 monuments are untraceable out of the sample of monuments studied, no further surveys were conducted for the remaining monuments, even nearly a decade after the original study,” the panel said.
- The ASI submitted that even as the monuments lost to urbanisation or dams can be deemed gone, it will make one last attempt to locate the 24 untraceable monuments.
- If any of those can be traced, the missing monuments list will be pruned.

## 6. Section 35 of the AMASR Act

- However, deleting the lost/untraceable monuments from the protected list may not be that simple.
- The deletion requires denotification of the said monument under Section 35 of the AMASR Act, which happens to be a long-drawn process.
- Section 35 has the provision to issue notifications only for such Centrally Protected Monuments (CPMs) which, according to the central government, have ceased to be of national importance.
- The situation of a missing monument cannot be automatically equated with the loss of its historical importance, the committee said.

## 7. The wayforward

- It recommended that the untraceable monuments may not be removed from the list, because once that is done, there would be no imperative to find them.
- Since the missing monuments cannot continue to be on the protected list either, the Committee recommended that the list of Untraceable Monuments may be maintained as such and if necessary, the AMASR Act be amended to include this terminology.

**GS I: Social reformer**

**AHILYABAI HOLKAR**

## 1.Context

Maharashtra Education Minister Deepak Kesarkar told the state Legislative Council that he has sought a proposal from the district administration to **rename the Western Maharashtra city of Ahmednagar** as ‘Punyashlok Ahilyadevi Nagar’, after the 18th century Malwa queen, Ahilyabai Holkar.

## 2.About Ahilyabai holkar

- Ahilyabai was Born in Chondi village of Ahmednagar to the village head Mankoji Shinde, on May 31, 1725, Ahilyabai was one of the few women rulers of Medieval India.
- While the education of girls and women was rare at that time, Mankoji insisted on it for his daughter.
- When she was eight years old, Malhar Rao Holkar, the army commander to Peshwa Bajirao, is believed to have spotted her at a temple service in Chondi. Impressed by her devotion and character, he decided to get his son, Khande Rao, married to her
- Ahilyabai took control of Malwa after her husband’s death in the Battle of Kumbher against the king of Bharatpur in 1754
- She excelled at administrative and military strategies under the guidance of her father-in-law, who believed she should lead her people, and not die by Sati after Khande Rao passed away
- After the death of her father-in-law and son a few years later, she petitioned the Peshwa to become the ruler, backed by the support of her army.



## 3.Administration and temple building



- According to an article in Google’s Arts and Culture platform, “During her reign, Malwa was never once attacked, when at that time the whole of Central India was facing a power struggle, with battles being fought for the throne. Under her rule, Malwa remained an oasis of stability and peace.”
- Under Holkar, the city of Maheshwar became a literary, musical, artistic and industrial centre, and she helped establish a textile industry there, which is now home to the famous Maheshwari saris
- Her role in the restoration of Hindu temples is often emphasised.
- In 1780, she had the Kashi Vishwanath temple in Varanasi rebuilt, nearly a century after Mughal king Aurangzeb ordered its destruction.
- Apart from holy sites like Badrinath, Dwarka, Omkareshwari, Gaya, and Rameswaram, Holkar also supported the construction of resting lodges for travellers, and of public ghats

## GS I: Indian modern history

# BATTLE OF KOREGAON

## 1. Context

Recently, it was the 205th anniversary of the Battle of Koregaon Bhima. Every year on January 1, thousands of people belonging to the Mahar community in Maharashtra gather near the 'victory pillar' in Koregaon to commemorate an event that took place 200 years back.

## 2. Battle of Koregaon

- Bhima Koregaon is a small village located in the present-day Pune district of Maharashtra. The battle of Bhima Koregaon has an important place in the history of India. The battle of Bhima Koregaon was fought on 1st January 1818.

- The Battle of Bhima Koregaon was fought between the Peshwa faction of the Maratha confederacy and the British East India Company. The Battle of Bhima Koregaon was part of the Third Anglo-Maratha War.
- The third Anglo-Maratha resulted in the defeat of the Peshwas which led to the rule of the British East India Company in almost all parts of south, central and western India.



### 3. Who were the Mahars

- Historically, Mahars were considered untouchables. But the nature of their work, often in administration or military roles, situated them with upper castes quite regularly.
- Maratha King Shivaji recruited several Mahars into the Maratha army in the 17th century. The Mahar men often served as guards or soldiers.
- The Mahar community even fought alongside Peshwa forces in many battles, including the third battle of Panipat.

- However, relations between the Mahars and Peshwas turned sour after Baji Rao II reportedly insulted the community by rejecting their offer to join and serve in his army.

#### 4. Leaders and strength of armies

- Peshwa Baji Rao II led the army of Peshwas in the Battle of Bhima-Koregaon. The Marathas had a strong force of 28,000 soldiers. The Maratha army had 8,000 infantry soldiers and 20,000 cavalry soldiers.
- The other important leaders who led the Marathas in the Battle of Bhima-Koregaon were Bapu Gokhale, Appa Desai, and Trimbakji Dengele.
- Captain Francis F. Staunton led the British East India Company. The British East India Company had around 800 soldiers.
- There were 500 infantry and 300 cavalry soldiers. The British East India Company also had 24 artillery cannons.
- The Marathas army led by Peshwa Baji Rao II was on their way to attack the position of the British East India Company in Pune.
- On the way, this army of Marathas was challenged by 800 soldiers led by Captain Francis F. Staunton, thus leading to the Battle of Koregaon Bhima.

#### 5. Result of the Battle

- The British East India Company successfully defended and the troops of Peshwa ended up withdrawing from the battle.
- In the contemporary caste-based society, the Mahars were considered untouchable. The Battle of Bhima Koregaon attained legendary status among the Scheduled Castes of India.
- The People of the Scheduled Caste saw this battle as a victory of Dalits over the oppression of the people from the higher caste.
- In Koregaon, the British East India Company installed an obelisk or victory Pillar to commemorate those who fought for them.
- Dalits believed that this was a victory of the Mahar community against the caste injustices perpetrated by the Peshwas.

#### GS I: Indian modern history

# INDIAN NATIONAL CONGRESS FORMATION AND SPLIT

## 1.Context

The Congress recently celebrated their 138th Foundation day.

The Indian National Congress (INC), India's largest opposition party, marked its 138th foundation day on December 28



THE FIRST INDIAN NATIONAL CONGRESS, 1885.

## 2.Formation of Indian National Congress (INC)

The English bureaucrat Allan Octavian Hume or AO Hume is credited as the founder of the organisation

On December 28, 1885, 72 social reformers, journalists and lawyers congregated for the first session of the INC at Gokuldas Tejpal Sanskrit College, Bombay. At that point, the aim of this group was not to demand independence from the ongoing colonial rule but to influence the policies of the British government in favour of Indians

Its objective is often described as providing a “safety valve” as the time, through which Indians could air out their grievances and frustration.

### **3. Foundational objectives**

1. The fusion into one national whole of all the different elements that constitute the population of India
2. The gradual regeneration along all lines, spiritual, moral, social, and political, of the nation thus evolved
3. The consolidation, often, the union between England and India

### **4. Demand for Independence by INC**

- For a few years party's work continued, to shift towards colonial administrators' attitudes and policies on the rights and powers allowed to Indians
- Hume and the party were also criticised, by the British for attempting to change the existing systems that favoured them and by some Indians for not achieving significant results, initially. Hume left India around the end of the 19th Century.
- The party largely consisted of educated, upper-class people who were likely to have studied abroad.
- But with time, this grouping became more diverse, as the organisation began setting up provincial organisations.
- At its Eleventh Session in 1895, there was an increase in the number of delegates from 1,163 the previous year to 1,584
- President Surendranath Banerjea congratulated the Congress for bringing together “the scattered element of a vast and diversified population.”
- The members frequently protested issues of British colonialism, such as the Bengal famine and the drain of wealth from India.
- However, these protests were at this point usually limited to prayers and petitions, including writing letters to the authorities. As the British rule continued, there grew differences in what the party’s functioning should be like.

### **5. Splits and reconvening**



- One of the biggest strengths of the party, which helped it appeal to a broad section of Indian society, was having members who held different ideological positions
- In Surat in 1906, the divisions between the ‘moderates’ led by Gopal Krishna Gokhale and Surendranath Banerjea, and the ‘extremists’ led by Bal Gangadhar Tilak came to the fore and there was a split.
- While Tilak and Lala Lajpat Rai wanted the Congress to boycott the visit of the Prince of Wales in protest against the Bengal Partition a year prior, the moderates opposed any such move.
- But by 1915, the Bombay session saw these two groups coming together again as one.
- The pattern of splits and eventual cohesion continued well after Indian independence, even after the party came to completely dominate successive general elections under Prime Minister Jawaharlal Nehru
- In the late 1960s, under PM Indira Gandhi, there was a power struggle. There was disagreement over the economic policies that were to be followed by the government, with Gandhi leaning strongly towards socialism, unlike senior leader Morarji Desai
- The Presidential elections to be held around this time became a kind of proxy war, with both factions pushing for their candidates, culminating with Gandhi’s candidate VV Giri winning
- Congress President S Nijalingappa expelled the Prime Minister from the Congress, and the party officially split into Congress (R) led by Indira and Congress (O), which later merged with the Janta Party.

## INDIAN NATIONAL CONGRESS ROLE IN INDEPENDENCE

### 1. Background

- Indian National Congress, by the name of Congress Party, is broadly based political party of India.
- Formed in 1885, the Indian National Congress dominated the Indian movement for Independence from Great Britain.

- It subsequently formed most of India's governments from the time of independence and often had a strong presence in many state governments.

## 2. The Pre-independence Period

- The Indian National Congress first convened in December 1885, though the idea of an Indian nationalist movement opposed to British rule dated from the 1850s.
- During its first several decades the Congress party passed fairly moderate reform resolutions, though many within the organization were becoming radicalized by the increased poverty that accompanied British imperialism.

### 2.1 Swadeshi movement

In the early 20th century, elements within the party began to endorse a policy of swadeshi (of our own country), which called on Indians to boycott imported British goods and promoted Indian-made goods.

### 2.2. Home Rule

By 1917 the group's "**extremist**" Home Rule wing, which was formed by Bal Gangadhar Tilak and Annie Besant the previous year, had begun to exert significant influence by appealing to India's diverse social classes.

### 2.3. Noncooperation

In the 1920s and 30s, the Congress Party led by Mahatma Gandhi began advocating nonviolent noncooperation.

The new change in tactics was precipitated by the protest over the perceived feebleness of the constitutional reforms enacted in early 1919 (Rowlatt Acts) and Britain's manner of carrying them out, as well as by the widespread outrage among Indians in response to the massacre of civilians in Amritsar (Punjab) that April.

### 2.4. Civil disobedience

- Many of the acts of civil disobedience that followed were implemented through the All India Congress Committee formed in 1929 which advocated avoiding taxes as a protest against British Rule.
- Notable in that regard was the **Salt March** in 1930 led by Gandhi.

Another wing of the Congress party, which believed in working within the existing system, contested general elections in 1923 and 1937 as the Swaraj (Home Rule) Party with particular success in the latter year, winning 7 out of 11 provinces.

## 2.5. World War II

- When **World War II** began in 1939, Britain made India a belligerent without consulting Indian elected councils.
- That action angered Indian officials and prompted the Congress Party to declare that India would not support the war effort until it had been granted complete independence.

## 2.6. Quit India

- In 1942 the organization sponsored mass civil disobedience to support the demand that the British "**quit India**".
- British authorities responded by imprisoning the entire Congress Party leadership, including Gandhi and many remained in Jail until 1945.
- After the war, the British government of Clement Attlee passed an **independence bill** in July 1947 and independence was achieved the following month.
- In January 1950 India's constitution as an independent state took effect.

### GS I: Indian modern history

# GEOGLYPHS



## 1. Context

Experts and conservationists have raised concerns that the proposed mega oil refinery in Barsu village, Maharashtra, may damage nearby prehistoric geoglyphs.

## 2. Geoglyphs

- A geoglyph is a form of prehistoric rock art. It can be carved on Laterite stone (Sada in Marathi). It can be in the form of rock paintings, etchings, cup marks, and ring marks, India's largest rock engraving or geoglyph is in Kasheli in the Ratnagiri district.
- It has 18x13 meters large figure of an elephant. Some of these clusters have one or two standalone figures of larger-than-life scale and others show multiple figures gathered together.



**Image Source: The Indian Express**

## 3. Ratnagiri's pre-historic Rock art

- Clusters of geoglyphs are spread across the Konkan coastline in Maharashtra and Goa, spanning around 900 km.

- Ratnagiri district has more than 1,500 pieces of such art, also called "Katal Shilpa," spread across 70 sites.
- Age: According to carbon dating, these sites are believed to be over 12,000-20,000 years old.
- The sites are protected by the Archaeological Survey of India (ASI).
- The figures depicted in the geoglyphs include humans and animals such as deer, elephant, tiger, monkey, wild boar, rhinoceros, hippopotamus, cattle, pig, rabbit, and monkey.
- They also include a high number of reptilian and amphibian creatures such as tortoises and alligators, aquatic animals such as sharks and stingrays, and birds like peacocks.

#### 4. Inclusion in UNESCO's list

- In April 2022, these sites in the Konkan region were added to a tentative list of UNESCO's world heritage sites.
- The UNESCO listing mentions "Konkan geoglyphs." However, elsewhere, the term petroglyph (literally, "rock symbol/character") is also used.
- UNESCO's tentative world heritage list mentions seven sites with petroglyphs in Ratnagiri district-Ukshi, Jambharun, Kasheli, Rundhe Tali, Devishsol, Barsu, and Devache Gothane, one in Sindhudurg district-Kudopi village, and nine sites at Phansamal in Goa.

#### 5. Significance of the rock art

- It is evidence of the continued existence of human settlements from the Mesolithic (middle stone age) to the early historic era.
- It is amongst three potential sites to become world heritage sites.
- The other two include Jingkieng Jri, the living root bridge in Meghalaya, and Sri Veerabhadra Temple in Andhra Pradesh's Lepakshi.
- It depicts how people adapted to wetlands in a dry-arid plateau having shallow rock pools, streams, and watercourses.
- Its clusters are examples of advanced artistic skills showing the evolution of techniques of etching and scooping in rock art.

- It has carvings of humans and animals such as deer, elephant, tiger, monkey, wild boar, rhinoceros, hippopotamus, cattle, pig, rabbit, and monkey.
- It also includes a high number of reptilian and amphibian creatures such as tortoises and alligators, aquatic animals such as sharks and sting rays, and birds like peacocks.

## GS I: Social reformer

# SATYENDRA NATH BOSE

## 1. Background

- When a relatively unknown Kolkata-born teacher wrote a letter to Albert Einstein in 1924 about his breakthrough in quantum mechanics, nobody knew he was going to make history.

That teacher was Satyendra Nath Bose, who in 1924 reached out to the German physicist while claiming that he had derived Planck's law for black body radiation (which refers to the spectrum of light emitted by any hot object) without any reference to classical electrodynamics.

- Bose asked Einstein to review his research paper and, if he found it important enough, get it published.
- Impressed by Bose's findings, Einstein not only arranged for the publication of the paper but also translated it into German.
- In his translator's note, he said, "**Bose's derivation of Planck's law** appears to me an important step forward.
- The method used here also yields the quantum theory of ideal gas, as I shall show else." This recognition catapulted Bose to fame and glory.
- He went on to work with Einstein and together they developed what is now known as the Bose-Einstein statistics.

- Today, in honour of his legacy, any particle that obeys the Bose-Einstein statistics is called a **boson**.
- On his 129th birth anniversary, we take a look at the Indian physicist's illustrious legacy and stellar achievements.

## 2. Early life

- Born on January 1, 1894, Bose grew up and studied in Kolkata, where he solidified his position as an exemplary academician.
- His father, an accountant in the Executive Engineering Department of the East Indian Railways, gave him an arithmetic problem to solve every day before going to work, encouraging Bose's interest in mathematics.
- By the age of 15, he began pursuing a Bachelor of Science degree at the Presidency College, and later finished his MSc in Mixed Mathematics in 1915.
- Bose topped his class for both degrees and at 22, he was appointed as a lecturer at Calcutta University, along with astrophysicist Meghnad Saha.
- These were tough times for Indian researchers as World War I had broken out and, European scientific journals came to India quite infrequently.
- Not only this, most of the research papers weren't available in English and both Bose and Saha had to learn scientific terms in German and French languages to read published works.
- However, the new skill came in handy for them in 1919, when they published English translations of Albert Einstein's special and general relativity papers.
- Two years later, Bose was appointed to the position of Reader in Physics at the University of Dhaka.
- It was here that he made his most significant contributions to physics.

## 3. Planck's formula

While teaching Planck's formula for the distribution of energy from black body radiation, Bose began questioning the way particles were counted his basic argument was that one photon of light is not distinguishable from another of the same colour and came up with his own derivation, instead of relying on classical

electrodynamics like his predecessors.

#### 4. The Philosophical Magazine

- Bose first sent his findings, recorded in a paper titled Planck's Law and the Hypothesis of Light Quanta, to a famous science journal called **The Philosophical Magazine**.
- However, the paper was rejected. Bose didn't lose hope and made the bold decision of sending his research to Einstein.
- The publication of the paper completely changed the Indian physicist's life and career.
- He was soon granted study leave from his university for two years and allowed to visit Europe. During his trip, Bose got an opportunity to meet other famous scientists of that era, such as Paul Langevin and Madame Curie.
- He also joined the laboratory of Maurice de Broglie where he learnt techniques of X-ray spectroscopy and crystallography, the branch of science that deals with the arrangement of atoms in crystalline solids.

#### 5. D2 Statistics and Total Reflection of Electromagnetic Waves in the Ionosphere

- After his two-year stay in Europe, Bose came back to India and was appointed professor of physics and then Head of Department at Dhaka University in 1927.
- Here, he completely devoted himself to teaching and guiding research.
- Bose designed equipment for setting up an X-ray crystallography laboratory at the university and wrote several papers on a range of subjects, such as '**D2 Statistics**', and '**Total Reflection of Electromagnetic Waves in the Ionosphere**'.
- In 1945, he left Dhaka to return to his alma mater, the University of Calcutta, as the Khaira Professor of Physics.
- He retired from the University of Calcutta in 1956 and spent a year as the Vice Chancellor at the Viswa-Bharati University.

## 6. Padma Vibhushan award

- Bose was awarded Padma Vibhushan, one of the highest civilian awards in the country, by the Indian government in 1954 and five years later, was appointed as National Professor, the highest honour in India for scholars.
- He lived the remainder of his life in Kolkata, until his death in 1974.

## GS I: Indian heritage

# VADNAGAR AS WORLD HERITAGE SITE

## 1.Context

Two sites in Gujarat have made it to the **tentative list of UNESCO World Heritage sites**: Vadnagar, and the Sun Temple of Modhera, both in the Mehsana district of northern Gujarat.

## 2.What is world heritage site

A World Heritage Site is a location with an “outstanding universal value”

This signifies “cultural and/or natural significance which is so exceptional as to transcend national boundaries and be of common importance for present and future generations of all humanity”

According to the World Heritage Convention’s operational guidelines, a tentative list is an “inventory” of properties a country believes deserve to be a World Heritage Site

After UNESCO includes a place in the Tentative List, that country has to prepare a nomination document that will be considered by the UNESCO World Heritage Committee.

This will be followed by a UNESCO evaluation and an inspection by their representative

## 3.About Vadnagar

- Vadnagar, a city known by names like Vridhanagar, Anandapur, Anantapur and Nagar, is said to have been inhabited uninterruptedly for over 2,700 years
- Several archaeological excavations began here in 2006 when Prime Minister Narendra Modi was the Chief Minister of Gujarat and highlighted the city as a centre of Buddhism.
- The description of Vadnagar in UNESCO's Tentative List reads: "The town represents a continuously evolving historic urban landscape/area which played a major role in the hinterland trade network of Western India.
- The continuity of the historic town proves its resilience and outstanding universal value unlike the sites like Harappa and Kalibangan, (Rajasthan) which were abandoned eventually"
- The town's fortifications, arched gateways (toranas), temples, wells, residential structures (kothis) and excavated sites like Buddhist monasteries and dedicated stupas showcase the architectural influence of various cultural periods.
- The extensive water management system here has also played a role in the town's continuity.
- The study of the historical geography of ancient India reveals Vadnagar was situated at a strategic location of two major ancient trade routes:
  - one joining central India with the Sindh and further northwest regions, while another connected the port towns on Gujarat's coast to northern India
  - Excavated cowry shells traced to the Maldives further imply involvement in overseas trade
  - A gold coin, believed to be from the Mamluk dynasty of Egypt that dated back to the 15th century, was also found.

#### **4.Vadnagar excavations**

- The first excavations in Vadnagar happened in 1953-54 and were later taken up by the Gujarat state archaeology and museum directorate in 2006
- In 2014, the Archaeological Survey of India (ASI) took up excavations in Vadnagar's Ghaskol, Darbargadh and Badi Garbano Sheri. The excavation was conducted till 2022 to create an Experiential Museum.



- The excavations showed an unbroken sequence of seven successive cultures which establish its antiquity back to 750 BCE.
- Most excavations are from pre 2nd century BCE to the Gaekwad period
- A mound rises gently and the highest point in the middle of the settlement is 25 metres high, called Darbargadh.



**Image source: ASI**

### **5.Vadnagar: as a centre of buddhism**

- Chinese traveller Xuanzang or Hieun Tsang is said to have visited Vadnagar around 641 AD, referring to it as ‘Anandpur’ in his writings, which also record how more than 1,000 monks of the Sammitiya School or Little Vehicle lived in 10 monasteries at Vadnagar, suggesting it was an important centre of Buddhist learning
- Vadnagar is currently surrounded by the remains of older structures, such as a fortification wall punctured by a series of gates that mark the entry and exit points of the town
- Primary entry and exit points are marked by elaborate single-storey stone gateways



- Ambaji Mata Temple, the city's oldest, dates back to the 10th -11th Century CE.
- Two identical gates outside the fortification wall to the north of the town are Kirti Torans, built in yellow sandstone without mortar or any other cementing material
- Vadnagar can be compared to the historic living cities of Mathura, Ujjain and Varanasi as cities inhabited since the early historic period and in the modern day



Image source: [Eurasia review](#)

GS I: Indian heritage & culture

## LINGAYATS AND VOKKALIGAS

### 1.Context

**Politics around the Lingayat community** has once again taken centre stage in Karnataka, with a section of BJP MLAs and seers in the community demanding inclusion of a large Lingayat sub-sect in an OBC quota category that provides 15% reservation in government jobs and education in the state.

### **PANEL TO SUBMIT REPORT IN 3 MTHS**

<ul style="list-style-type: none"><li>➤ The state cabinet decides to do away with 3A and 3B categories, creates 2C and 2D for Lingayats and Vokkaligas</li></ul>	in education and government jobs, respectively
<ul style="list-style-type: none"><li>➤ The decision, which came on the last day of the winter session, is based on the interim report submitted by the Karnataka State Permanent Backward Classes Commission</li></ul>	<ul style="list-style-type: none"><li>➤ The state govt also seeks report from the commission on the quantum of quota to be given to the economically weaker sections before increasing the reservation of Lingayats and Vokkaligas</li></ul>
<ul style="list-style-type: none"><li>➤ Both communities were earlier classified as 3A and 3B, with 4% and 5% reservation</li></ul>	<ul style="list-style-type: none"><li>➤ Law and parliamentary affairs minister Madhuswamy says the panel may take three months to submit the report</li></ul>

### 2.About Lingayats & Vokkaligas

#### 2.1.Lingayats

- The Lingayats are a dominant community who make up nearly 17% of Karnataka's six crore population .

- The community can determine the outcome of polls in as many as 90-100 of the state's 224 Assembly constituencies.
- The Lingayats, classified as a Hindu sub-caste called Veerashaiva Lingayats, are essentially followers of the 12th-century philosopher Saint Basavanna, who started a movement to help sections of society break away from the chains of caste.
- The Veerashaiva Lingayats are an amalgamation of the followers of Basavanna's teachings and Veerashaivas who follow more traditional Hindu practices.
- The Lingayat community has many sub-sects identified on the basis of the vocations they followed.

## 2.2.Vokkaligas

- The Yelahankanadu Prabhus were Gowdas or tillers of the Land. They belonged to Gangatgar Vokkalu sect, the ancestors of which were migrants from Morasunadu near Kanjeeपुरam ,They used to speak Telugu.
- Fourth in succession from Rana Bhairave Gowda, founder of the dynasty of Avanti Nadu Prabhus and great grandson of Jaya Gowda, who established separate dynasty, the famous Yelahanka Nadu Prabhus, Kempe Gowda I ruled for 46 years commencing his reign from 1513
- Jaya Gowda accepted the sovereignty of the Vijayanagar emperor.
- Today the Vokkaliga community embraces within its fold the Morasu Vokkaligas, the Gangadicara Vokkaligas, Reddy Vokkaligas, Kunchitiga Vokkaligas, Hallikaru Vokkaligas and so on.

## 3.Key takeaways

- Veerashaiva Lingayats have been provided 5% reservation under a special category called 3B.
- A sub-sect called the Panchamasali Lingayats basically agriculturists who account for nearly 70% of Lingayats have now risen in protest seeking reservations under the category 2A, which currently provides 15% reservations to backward castes.

- Vokkaliga community, which is currently in the 3A category, will be moved to a newly-created 2C category with 4% reservation.
- Karnataka currently has 32% quota for OBC, and 17% and 7% quota for Scheduled Castes and Scheduled Tribes, respectively, taking the total to 56%.
- Lingayats are considered the most populous community in the state, followed by Vokkaligas. The new categories will not affect the existing reservation provided to other communities.
- The increase in reservation from the one granted currently to these communities — 4% for Vokkaligas and 5% for Lingayats via redistribution of the EWS quota will be based on the population of various communities assessed by the Karnataka State Commission for Backward Classes

## GS I: World geography

# HEAT DOME

## 1. Context

Several parts of Europe witnessed an unprecedented winter heat wave over New Year's weekend.

Calling it an “**extreme event**”, experts said that temperatures increased 10 to 20 degrees Celsius above normal.

## 2. Key points

- According to the report, at least seven countries recorded their hottest January weather ever.
- These included **Poland, Denmark, the Czech Republic, the Netherlands, Belarus, Lithuania and Latvia.**
- Climatologists suggested that the temperatures surged to summer or springtime levels.

- For example, at Korbielów, a small village in Poland, the mercury reached 19 degree Celsius a temperature the region is more used to in May and 18 degree Celsius above the one degree Celsius yearly average for January.
- Meanwhile, in parts of Belarus, where temperatures usually remain around zero degree Celsius, they peaked at 16.4 degree Celsius on January 1.
- The continent is experiencing an extreme warm spell because of the formation of a heat dome over the region.

### 3. What is Heat dome?

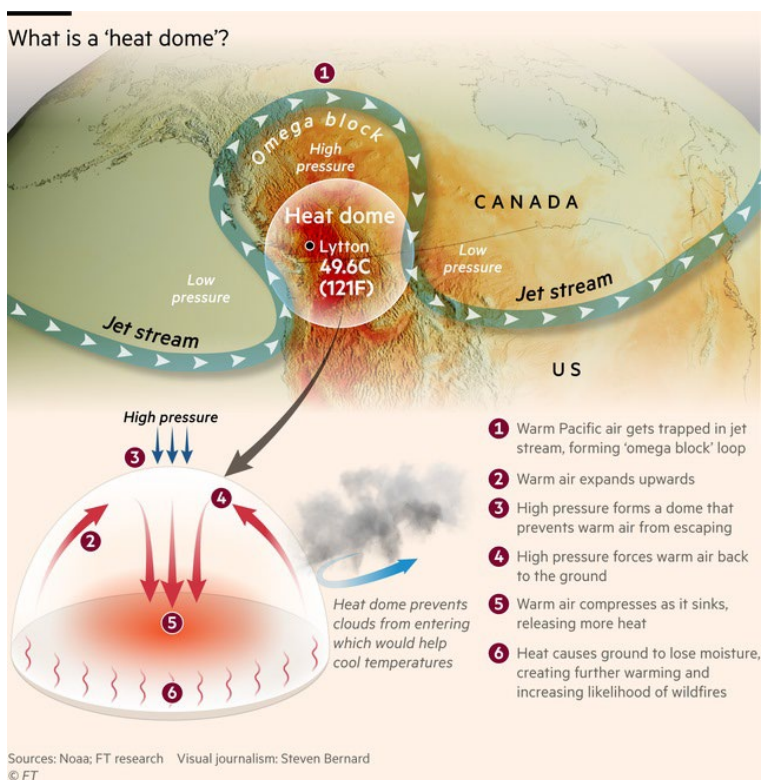
- A heat dome occurs when an area of high-pressure traps warm air over a region, just like a lid on a pot, for an extended period of time.
- The longer that air remains trapped, the more the sun works to heat the air, producing warmer conditions with every passing day.
- Heat domes generally stay for a few days but sometimes they can extend up to weeks, which might cause deadly heat waves.
- Scientists suggest that any region of high pressure, whether a heat dome or not, forces air to sink and once it reaches the ground, it gets compressed and becomes even warmer.
- Moreover, when air sinks, it gets drier and further raises the temperature of the area.

### 4. Relationship between heat domes and the jet stream

- The heat dome's formation is related to the behaviour of the jet stream an area of fast-moving air high in the atmosphere.
- The jet stream is believed to have a wavelike pattern that keeps moving from north to south and then north again.
- When these waves get bigger and elongated, they move slowly and sometimes can become stationary.
- This is when a high-pressure system gets stuck and leads to the occurrence of a heat dome.
- Although heat domes are likely to have always existed, researchers say that climate change may be making them more intense and longer.



- They suggest with the rising temperatures, it is expected that the jet stream will become more wavy and will have larger deviations, causing more frequent extreme heat events.



## 5. Previous instances of heat domes

- In 2021, a heat dome formed over western Canada and the US, causing deadly heat waves.
- Portland city in Oregon, US, saw the mercury rise to 46 degree Celsius while the temperature in Washington hit 49 degree Celsius.
- In Lytton in British Columbia, temperatures soared to over 46 degree Celsius.
- Hundreds of people are believed to have died due to this extreme weather event.
- Subsequently, a 2022 study found that this heat dome was amplified by climate change and it could become a once-in-10-year event if global

temperatures aren't kept under two degree Celsius above pre-industrialisation levels.

The researchers said that the dry soil one of the repercussions of the rising temperatures in different areas of the Pacific northwest “potentially allowed the heat to become more extreme, and so they amplified the heat that was already at a high level”.

- Another heat dome settled over the US in September 2022 and raised temperatures to a new high. The extreme heat fueled wildfires and stressed the power grid.

## GS II: International relations

# ALDERMAN

## 1. Context

In the recent municipal corporation elections, the Aam Aadmi Party (AAP) beat the incumbent Bharatiya Janata Party (BJP) by a slender margin, and mayor elections are due on Friday (January 6). “Alderman” refers to a member of a city council or municipal body, with exact responsibilities depending on the location of its usage. It is derived from Old English.

## 2. Origin of the Term

- Etymologically, the word comes from the combination Old English words for “old” (Anglian, ald or West Saxon, eald) and “man” (monn in Mercian/Anglian or mann in West Saxon).
- “Ald/eald” referred to “antique, of ancient origin, belonging to antiquity, primeval; long in existence or use; near the end of the normal span of life;

elder, mature, experienced,” according to the Online Etymology Dictionary  
The term “ald” itself is derived from “al” meaning “to grow, nourish.”

- The term for man has a more contested origin, with similar root words found in languages from Sanskrit (manuh) to Russian (muzh).  
“Aldormonn” (Mercian) or “ealdormann” (West Saxon) originally referred to elders of a clan or tribe, though soon it became a term for king’s viceroys, regardless of age.
- Soon, it denoted a more specific title – “chief magistrate of a county,” having both civic and military duties.

### 3. Alderman different roles in Different Countries

- Until the 19th century, there was no one role/definition of an alderman in Britain.  
Under the Municipal Reform Act 1835, municipal borough corporations consisted of councillors and aldermen.
- Aldermen would be elected not by the electorate, but by the council (including the outgoing aldermen), for a term of six years, which allowed a party that narrowly lost an election to retain control by choosing aldermen.
- The Local Government Act of 1972 finally abolished Aldermen with voting rights, with effect from 1974, except in the Greater London Council and the London borough councils, where they remained a possibility until 1978.
- In the US, depending upon the jurisdiction, an alderman could have been part of the legislative or judicial local government. A “board of aldermen” is the governing executive or legislative body of many cities and towns in the United States.
- Historically, in Canada, the term “alderman” was used for those persons elected to a municipal council to represent the wards. As women were increasingly elected to the municipal office, the term “councillor” slowly replaced “alderman”, although there was some use of the term “alderperson”.
- Australia and Ireland have also abolished the term and specific post of an alderman whereas, in South Africa, the term alderman refers to senior members of municipal councils. In Netherlands, the term refers to members of the municipal executive (rather than the council).



## 4. Alderman Controversy in Delhi

As per the Delhi Municipal Corporation Act, 1957, ten people, over the age of 25 can be nominated to the corporation by the administrator (The Lieutenant Governor). These people are expected to have special Knowledge or experience in municipal administration. They are meant to assist the house in taking decisions of Public importance.

### 4.1 The current controversy regarding the appointment of 10 aldermen has two facets.

- The first is with regards to the people nominated. After the recommendations were sent to the LG, two of the 10 nominees were found to be technically unfit for the job, forcing the BJP to retract their names to avoid embarrassment.
- Second, the appointment of aldermen by the LG is seen by many as an attempt by the BJP to continue exercising power in the MCD, despite its election loss.

## GS II: Governance

# DRAFT FOR ONLINE GAMES

## 1. Context

Recently, the Ministry of Electronics and IT (Meity) released the Draft Rules for Online Gaming. The Proposed rules have been introduced as an amendment to the Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021.

## 2. What do draft rules say?

- Online games will have to register with a self-regulatory body, and only games cleared by the body will be allowed to legally operate in India. Online

gaming companies will not be allowed to engage in betting on the outcome of games, the proposed rules say.

- The Proposed Rules include several important recommendations, including the creation of a self-regulatory body, a grievance procedure, and strict know-your-customer standards for verification.

### **2.1 Self-Regulatory body**

They will have a board of directors with five members from diverse fields including online gaming, public policy, IT, Psychology, and medicine. It must make sure that nothing in the registered games is in the interest of the sovereignty and integrity of India, defense of India, security of the state, friendly relations with other nations, or public order, or incites the commission of any cognizable offense related to the aforesaid.

### **2.2 Registration of online games**

Online games must register with a self-regulatory organization, and only those approved by the organization will be permitted to legally function in India.

### **2.3 Prohibition on betting**

According to the proposed regulations, online gaming organizations will not be permitted to place bets on the result of games.

### **2.4 Compliance officer**

Online gaming platforms will also need to appoint a compliance officer to make sure the platform is abiding by the rules, a nodal officer to act as a liaison with the government and help law enforcement agencies, and a grievance officer to handle user complaints.

## **3. Need for the Rules**

- Around 40 to 45 % of the gamers in India are women, and therefore it was all the more important to keep the gaming ecosystem safe.
- It is believed to be a great first step for comprehensive regulation of online gaming and will reduce the state-wide regulatory fragmentation that was a big challenge for the industry.
- The goal is to regulate online gaming platforms as intermediaries and place due diligence requirements on them.

- The proposed rules aim to grow the online gaming sector and encourage innovation.

#### 4. Issues with Online Gaming

- Many social activists, government officials, and those in law enforcement believe that online games like rummy and poker are addictive; and when played with monetary stakes may lead to other issues.
- Some people are losing money and falling into a debt trap. Some of the victims took their own lives.
- The study shows that online games are addictive whether these games involve skill or mere tricks.
- Reportedly, there have been a few instances where youngsters, faced with mounting debts due to losses in online games have committed other crimes like theft and murder.
- Shifting of users to grey or illegal offshore online gaming apps not only results in loss of tax revenue for the State and job opportunities for locals but results in users being unable to avail remedies for any unfair behavior or refusal to pay out winnings.

#### 5. Online gaming sector in India

- The revenue of the Indian mobile gaming industry is expected to reach USD 5 billion in 2025.
- The industry grew at a compound annual growth rate (CAGR) of 38% in India between 2017-2020, as opposed to 8% in China and 10% in the US.
- It is expected to grow at a CAGR of 15% to reach Rs 153 billion in revenue by 2024, as per a report by VC firm Sequoia and management consulting company BCG.

#### GS II: Governance

## ANIMAL RIGHTS AND SAFETY



## 1. Context

A Constitution Bench of the Supreme Court of India will deliver its verdict on the validity of Tamil Nadu's law permitting the practice of jallikattu in the state. Usually held during the Pongal season, Jallikattu is a sport where men compete against each other to hold on to the humps of agitated bulls that are released into an open area.

## 2. Animal rights and safety

The Constitution of India establishes a duty on both the state as well as on people to ensure the security and conservation of animals at all costs.

### Article 21

Due to the expansive interpretation taken by the courts, the rights of the animals are also protected under Article 21 of the constitution.

Every species has a right to life and security, by the law of the land, and this right is not merely limited to human beings but is expanded to include within its ambit animals and birds as well.

### Article 48A

According to Article 48A, it is the responsibility of the state to improve the strength of animals and safeguard the wildlife of the country. It shall strive to enhance the population of animals and ensure that they are protected from all attacks.

### Article 51A(g)

According to Article 51A(g), it is the Fundamental Duty of every citizen to protect and improve forests and wildlife and to have compassion for all living creatures.

## 3. Key Provision of the Prevention of Cruelty of Animals Act, 1960

The Prevention of Cruelty to Animals Act, 1960 (hereinafter PCA Act, 1960) is the first enacted law for safeguarding the rights and protecting animals from pain and suffering inflicted by humans.

### **Some of the main features of the Act are as follows:**

The Act has established the definition of animals to include any living creature other than human beings and different forms of animals.

#### **3.1 Offenses & punishments:**

To protect the animals from lifetime agony and pain, the Act has set forth punishments for offenders who cause unnecessary suffering and cruelty towards animals.

The Act further discusses different forms of cruelty inflicted on animals, its exceptions, and the process of killing a suffering animal, when cruelty has been imposed, to avoid any further suffering for that animal.

#### **3.2 Guidelines for experimenting on animals**

The Act underlines the guidelines to be followed while experimenting on an animal for scientific purposes and exhibition of performing animals along with their offenses.

#### **3.3 Animal Welfare Board of India**

One of the features that the Act specifies is the establishment of the Animal Welfare Board of India (hereinafter AWBI).

### **4. Key Provisions of the Wildlife Protection Act, 1972**

The Wildlife Protection Act, of 1972 aims to preserve the wildlife species of both fauna and flora and establishes reserved places for their survival.

The Act also lays down restrictions on various animal species to be hunted down.

## **Prohibition of hunting**

The Act prohibits the hunting of animals mentioned under Schedule I, II, III, and IV.

## **Setting up of the following boards**

### **4.1 National Board for Wildlife & State Board for Wildlife**

It is a statutory body established under the Act that is responsible for advising the government on wildlife conservation, reviewing and approving various projects relating to wildlife, and promoting the conservation and development of wildlife.

A separate state Board for Wildlife has also been directed to be set up in each state under the said Act.

### **4.2 Central Zoo Authority**

It is yet another body incorporated under the Act.

### **4.3 Wildlife Crime Control Bureau**

It was constituted under the Act to fight the ever-growing crime rates against wildlife in the country.

## **5. Care towards animals**

On any reasonable reading of the constitution, it might be difficult to hold that animals are promised rights to life and personal liberty under Article 21 and equality under Article 14-a conclusion to the effect could well lead to bizarre consequences.

Arguments in favor of personhood invariably spring out of a belief that animals, especially certain kinds of animals such as apes, elephants, and whales, share much in common with human beings.

## GS II: Polity

# DELIMITATION

### 1.Context

The Election Commission of India said that **it has begun the process of delimitation of Assembly and Parliamentary constituencies in Assam**. The process will be based on Census data from 2001. The last delimitation of constituencies in Assam was done in 1976 on the basis of the 1971 Census.

### 2.What is delimitation

Delimitation is the act of redrawing boundaries of Lok Sabha and state Assembly seats to represent changes in population.

The main objective of delimitation is to provide equal representation to equal segments of a population.

### 3.Process of delimitation

- Delimitation is carried out by an independent Delimitation Commission, appointed by the Government of India under provisions of the Delimitation Commission Act.
- The Delimitation Commission is appointed by the President of India and works in collaboration with the Election Commission of India.
- It comprises a retired Supreme Court judge, the Chief Election Commissioner of India and respective State Election Commissioners.
- The Delimitation Commission is to work without any executive influence
- The Constitution mandates that the Commission's orders are final and cannot be questioned before any court as it would hold up an election indefinitely.
- For instance, in 1971, Assam's population was 1.46 crore. In 2001, it increased to 2.66 crores. Further, the population does not grow uniformly across all areas of a state. Hence, delimitation of constituencies is periodically carried out to reflect not only an increase in population but changes in its distribution.

#### 4. Procedure of delimitation

- Under Article 82, Parliament is to enact a Delimitation Act after every Census. Once the Act is in force, the Union government sets up the Delimitation Commission
- The Commission is supposed to determine the number and boundaries of constituencies in a way that the population of all seats, so far as practicable, is the same
- The Commission is also tasked with identifying seats reserved for Scheduled Castes and Scheduled Tribes
- The draft proposals of the Delimitation Commission are published for public feedback, The Commission also holds public sittings.
- After hearing the public, it considers objections and suggestions, and carries out changes, if any, in the draft proposal.
- The final order is published in the Gazette of India and the State Gazette concerned and comes into force on a date specified by the President.

#### 5. Previous delimitation exercises

- In the history of the Indian republic, Delimitation Commissions have been set up four times 1952, 1963, 1973 and 2002 under the Acts of 1952, 1962, 1972 and 2002.
- There was no delimitation after the 1981, 1991 and 2001 Censuses.
- However, the 2002 Act did not make any changes in total Lok Sabha seats or their apportionment between various states
- It also left out a few states including Assam, Arunachal Pradesh, Nagaland and Manipur from the exercise due to “security risks.”
- The central government reconstituted the Delimitation Commission for these four states as well as the union territory of Jammu and Kashmir on 6 March 2020.

#### 6. Missed delimitation exercises

- a. The last delimitation exercise that changed the state-wise composition of the Lok Sabha was completed in 1976 and done on the basis of the 1971 census



- b. The reason for not having more frequent delimitation processes is an unintended consequence of how the Constitution envisioned constituencies to be delimited
- c. The Constitution mandates that the number of Lok Sabha seats allotted to a state would be such that the ratio between that number and the population of the state is, as far as practicable, the same for all states.

### **6.Way forward**

However, this provision meant that states that took little interest in population control could end up with a greater number of seats in the Parliament.

The fear of losing meaningful political representation was especially great in the southern states which not only had had greater success in controlling populations but also economically developed such that they generated a lot more per capita revenue than the northern states.

Delimitation on the basis of population would disenfranchise them politically while the central government would continue to benefit from these states' economic contributions to the country.

To allay these fears, the Constitution was amended during Indira Gandhi's Emergency rule in 1976 to suspend delimitation until 2001

## **GS II: Polity**

# **REMOTE ELECTRONIC VOTING MACHINE (RVM)**

### **1.Background**

Soon after assuming office as Chief Election Commissioner, Shri Kumar's learning of domestic migration issues first hand from his trek to Dumak village in Chamoli district, focused his attention on enabling the migrant voters to exercise their franchise from their current place of residence.

### **2.Objective**

Objective of finding a technological solution which is credible, accessible and acceptable to all stakeholders, the Commission headed by Chief Election Commissioner has now explored the option of using a modified version of the time-tested model of M3 EVMs to enable voting at remote polling stations i.e., polling stations outside home constituency, for domestic migrants  
The migrant voter would thus need not travel back to his/her home district to exercise his/her franchise of voting.

### 3.Challenges

<b>Administrative challenges</b>	<b>Legal challenges</b>	<b>Technological challenges</b>
Enumerating remote voter self-voter declaration	Laws/rules needing amendments <ul style="list-style-type: none"> <li>• RP Act, 1950, 1951</li> <li>• The conduction of Election rules, 1961</li> <li>• The registration of Electors rules, 1960</li> </ul>	Method of remote voting
Providing controlled environment -ensuring secrecy of voting at remote locations	Defining migrant Voter <ul style="list-style-type: none"> <li>• Poll day absence to permanantly shifted</li> <li>• Retain registration at original place in the context of 'ordinary residency' &amp;temporary absence' legal construct</li> </ul>	Familiarity of the voters with the methods/ Multi constituency Remote EVM or any other technology

Provision of polling agents at remote voting booths & ensuring identification of voters to avoid impersonation	<p>Define Remote Voting</p> <ul style="list-style-type: none"> <li>• Dealing with territorial constitutional concept</li> <li>• Defining remoteness: outside constituency, outside district or outside state</li> </ul>	Counting of votes cast at remote booths and transmit to RO located in the state
Number of booths to be set up & locations		
Appointment of polling personnel for remote polling stations and supervision thereof		
Implementation of MCC in remote location (other state)		

#### 4. Way forward

The Commission in association with a renowned Public Sector Undertaking is now ready to pilot a Multi Constituency Remote Electronic Voting Machine (RVM) for facilitating participation of domestic migrants from their remote locations itself i.e., the places of their current residence for purposes of education/employment, etc., for voting for their home constituencies.

This modified form of EVM can handle up to 72 multiple constituencies from a single remote polling booth. The initiative, if implemented, can lead to a social transformation for the migrants and connect with their roots as many times they are reluctant to get themselves enrolled at their place of work for various reasons such as frequently changing residences, not enough social and emotional connect with the issues of area of migration, unwillingness to get their name deleted in electoral

roll of their home/native constituencies as they have permanent residence/property etc.

**GS II: Polity**

## CAST CENSUS

### 1. Context

Following an order by the Allahabad High Court directing that local body elections be held in Uttar Pradesh without any reservation for the Other Backward Classes (OBC), Deputy Chief Minister Keshav Prasad Maurya said the state government was ready to approach the supreme court, if required, regarding the matter. The High court had added that the state had not done enough to follow the "triple test formula" as suggested by the supreme court.

### 2. Cast Census

- The socio-economic and caste census (SECC) was conducted in 2011 for the first time since 1931.
- SECC is meant to canvass every Indian Family, both in rural and urban India, and ask about their economic status to allow central and state authorities to come up with a range of indicators of deprivation, permutations, and combinations that could be used by each authority to define a poor or deprived person.
- It is also meant to ask every person their specific caste name to allow the government to re-evaluate which caste groups were economically worse off and which were better off.
- SECC has the potential to allow for a mapping of inequalities at a broader level.

### 3. History of Caste Census

The caste census is the demand to include the caste-wise tabulation of India's population in the upcoming exercise.

### 3.1 Caste census in Colonial Era:

- The First Census conducted in 1871 included questions about caste. This data was then used to divide and conquer India.
- It first privileged Brahmins as interpreters of Indian culture and then targeted them as the root of caste-based oppression and inequality.
- This classification was also a source of anti-Brahmin movements of the 20th century.
- Every census until 1931 had data on caste.
- The practice was stopped by the British with the 1941 Census, citing financial constraints. The Indian government did not pick up the dropped parameter.

### 3.2 Caste data published in the Census post-independence:

- Since the first exercise in independent India in 1951, India has published separate data on Scheduled Castes (SC) and Scheduled Tribes (ST).
- The Census does not include data on other castes.
- The Government of India had decided on the policy of official discouragement of Caste.
- It was decided that in general, no race/caste/tribe inquiries should be made and such enquires should be restricted to the Scheduled Castes and Tribes notified by the President of India in pursuance of Articles 341 and 342 of the Constitution.

## 4. Importance of Caste Census

### 4.1 Promote Rational Decision Making

- A caste census, which will generate exhaustive data will allow policymakers to develop better policies, and implementation strategies, and will also enable a more rational debate on sensitive issues.

## 4.2 Promotes Democratic Policymaking

- Advocates of its inclusion believe that the activity will be a pro-poor exercise that will help plan better and more targeted welfare schemes in the country.
- A caste census would bring forward a large number of issues that any democratic country needs to pay attention to.
- For instance, this census will reveal information regarding caste-based marginalization, deprivation, the kind of jobs pursued by a caste, etc.
- So, the caste census is nothing but the collection of data that is necessary for any democratic policymaking.

## 4.3 The rationale for the Reservation Policy

- Some proponents also suggest that a Caste Census will also help reservation policymakers have a more accurate idea of the affirmative action needed.
- While this data is currently available for SC and ST populations, the OBC population is estimated widely as per the number noted by the Mandal Commission at 52%.
- The Justice Rohini Committee was appointed in 2017 to look into the sub-categorization of the OBC communities; however, in the absence of data, there can be no data bank or any proper sub-categorization.
- All commissions have had to rely on data from the last caste census (1931). There have been substantive demographic changes since then and therefore, the data has to be updated.

## 4.4 Constitutional Mandate

- Indian Constitution also favors conducting a caste census.
- Article 340 mandates for appointment of a commission to investigate the conditions of socially and educationally backward classes and make recommendations as to the steps that should be taken by the governments.

## 5. Last Cast Census and redundancy

- A separate Socio-Economic and Caste Census (SECC) was conducted by the Ministry of Rural Development in rural areas and the Ministry of Housing & Urban Poverty Alleviation in urban areas in 2011.
- It was the largest exercise of the listing of castes and has the potential of finding inequalities at a broader level.
- SECC was a tool to identify beneficiaries of state support and it is open for use by Government departments to grant and/ or restrict benefits to households.
- However, the SECC data excluded caste data and was published by the two ministries in 2016.
- The raw caste data was handed over to the Ministry of Social Justice and Empowerment.
- The ministry formed an Expert Group under the Former NITI Aayog Vice-Chairperson Arvind Pangaria for the classification and categorization of data.
- The Public data eventually released gave numbers of different castes in India but not the population-wise data as was the demand.
- Only the details of the economic conditions of the people in rural and urban households were released. The caste data has not been released till now.
- The Centre says that an analysis of the data showed "that the caste enumeration...was fraught with mistakes and inaccuracies" and "is not reliable".

## 6. Way Forward

- A Caste census without data integrity would be much worse. Instead of going behind the caste bases census, the government can subclassify the Backward classes like in Tamilnadu, Andhra Pradesh, West Bengal, etc. This will provide the benefit to intended beneficiaries.
- Since the government has already appointed Justice G Rohini's panel on the sub-categorization of OBCs. The panel has to fast-pace the sub-classification process.
- The Government can use technologies like Artificial Intelligence and machine learning to assess the SECC data and condense them into

meaningful categories and some important caste-based information. This will provide the necessary time to analyze the need for a caste census.

## GS II: Polity

# DISPUTES AMONG STATES

## 1. Context

The border dispute between Maharashtra and Karnataka is intensifying, with both states hardening their stance.

On December 27, both Houses of the Maharashtra Assembly passed a unanimous resolution to support a legal battle to resolve the dispute.

This came just days after the Karnataka Assembly passed a resolution reiterating Karnataka's position on the issue.

## 2. Maharastra-Karnataka border dispute

- The border dispute over Belagavi, Karwar and Nipani in North Karnataka is longstanding.
- When state boundaries were redrawn on linguistic lines as per the States Reorganisation Act of 1956, Belagavi became part of the erstwhile Mysore state.
- Maharashtra claims that parts of Belagavi, where Marathi is the dominant language, should remain in Maharashtra.



- In October 1966, the Centre set up the Mahajan Commission, led by the former Chief Justice of India Mehr Chand Mahajan, to resolve the border dispute in Maharashtra, Karnataka and Kerala.
- The Commission recommended that Belgaum and 247 villages remain with Karnataka.
- Maharashtra rejected the report and in 2004 moved to the Supreme Court.

### 3. Resolving the issue

- Attempts are often made to resolve inter-state disputes with the cooperation of both sides, with the Centre working as a facilitator or a neutral mediator.
- If issues are resolved amicably, Parliament can bring a law to alter state boundaries, such as the Get breaking news alerts Bihar-Uttar Pradesh (Alteration of Boundaries) Act of 1968 and the Haryana-Uttar Pradesh (Alteration of Boundaries) Act of 1979.

Union Minister Amit Shah met the Chief Ministers of both states and asked them to form a six-member team, comprising three ministers from each side, to address all boundary issues.

### 4. Other methods

There are other formal methods in the Constitution to resolve inter-state disputes.

#### 4.1. Judicial Redressal

The Supreme Court in its original jurisdiction decides imputes between states. Article 131 of the Constitution reads: "Subject to the provisions of this Constitution, the Supreme Court shall, to the exclusion of any other court, have original jurisdiction in any dispute.

- (a) between the Government of India and one or more States or
- (b) between the Government of India and any state or States on one side and one or more other states on the other or
- (c) between two or more states, if and in so far as the dispute involves any question (whether of law or fact) on which the existence or extent of a legal right depends:

Provided that the said jurisdiction shall not extend to a dispute arising out of any treaty, agreement, covenant, engagement and or another similar instrument which, having been entered into or executed before the commencement of this Constitution, continues in operation after such commencement, or which provides that the said jurisdiction shall not extend to such a dispute.

## 4.2. Inter-State Council

- Article 263 of the Constitution gives powers to the President to set up an Inter-state Council for the resolution of disputes between states.
- The Council is envisaged as a forum for discussion between the states and the Centre.
- In 1988, the Sarkaria Commission suggested that the Council should exist as a permanent body and in 1990 it came into existence through a Presidential Order.

The provision reads: "provisions concerning an inter-State Council if any time it appears to the President that the public interest would be served by the establishment of a Council charged with the duty of

(a) inquiring into and advising upon disputes which may have arisen between States

(b) investigating and discussing subjects in which some or all of the states or the Union and one more of the States, have a common interest or

(c) making recommendations upon any such subject and in particular, recommendations for the better coordination of policy and action concerning that subject, it shall be lawful for the President by order to establish such a Council and to define the nature of the duties to be performed by it and its organisation and procedure.

- In 2021, the Centre reconstituted the Inter-State Council and the body now has 10 Union Ministers as permanent invitees.
- The Standing Committee of the Council has been reconstituted with Home Ministers as Permanent invitees.
- The Standing Committee of the Council has been reconstituted with Central Home Minister as chairman.

- Finance Minister and the Chief Ministers of Maharashtra, UP and Gujarat are some of the other standing committee members.

## 5. Other inter-state disputes in India

In a reply to Parliament, in 2015, the Centre said that there are border disputes mostly arising out of claims and counter-claims over territories between

1. Assam-Meghalaya
2. Assam-Nagaland
3. Assam-Mizoram
4. Assam-Arunachal Pradesh and
5. Maharashtra-Karnataka.

### GS III: Science & technology

# GREEN HYDROGEN MISSION

## 1. Context

The government has formally approved the National Green Hydrogen Mission with the stated aim of making India a global hub for the production of green hydrogen. The ultimate aim is to fuel key sectors of the economy using hydrogen that is made by splitting water through an electrical process called electrolysis, using a device called an electrolyzer that is powered entirely by renewable energy.

## 2. Hydrogen as a fuel

- Hydrogen, the most common element in nature, exists only in combination with other elements and has to be extracted from naturally occurring compounds like water (which is a combination of two hydrogen atoms and one oxygen atom). Hydrogen is a clean molecule, but the process of extracting it is energy intensive.

- While hydrogen's potential as a clean fuel source has a history of nearly 150 years, it was only after the oil price shocks of the 1970s that the possibility of hydrogen replacing fossil fuels came to be considered seriously. Three carmakers -Japan's Honda and Toyota, and South Korea's Hyundai-have since moved decisively to commercialize the technology, albeit on a limited scale.
- The sources and processes by which hydrogen is derived are categorized by color tabs. Hydrogen produced from fossil fuels is called grey hydrogen, which constitutes the bulk of the hydrogen generated today.
- Hydrogen generated from fossil fuels with carbon capture and storage options is called blue hydrogen, while hydrogen generated using electrolyzers powered by renewable power sources is called green hydrogen.

### 3. Green Hydrogen Potential

- Green hydrogen has specific advantages. One, it is a clean burning molecule that can decarbonize a range of sectors including iron and steel, chemicals, and transportation. Two, renewable energy that can not be stored or used by the grid can be channeled to produce hydrogen.
- Green hydrogen is not commercially viable at present. The current cost in India is around Rs 350-400 per kg; it is likely to become viable only at a production cost of under Rs 100/kg. This is what the Hydrogen Energy Mission aims for.
- Green hydrogen could eventually potentially replace fossil fuels and fossil fuel-based feedstocks in fertilizer production, petroleum refining, steel production, and transport applications.
- The United States and European Union have already pledged incentives worth several billions of dollars for green hydrogen projects. India's Mission was first announced by the Prime Minister in his Independence Day speech in 2021.
- A major part of this is a proposed strategic intervention for the Green Hydrogen Transition Programme (SIGHT), under which two financial incentive mechanisms targeting the domestic manufacturing of electrolyzers and the production of green hydrogen will be promoted to achieve a

reduction in fossil fuel imports and abatement of annual greenhouse gas emissions by 2030.

- The draft Mission document is likely to propose support for the production and deployment of green hydrogen, alongside a major push for hydrogen in the auto sector-R&D for fuel cell development and pilot projects for fuel cell vehicles.

#### 4. Why India is Pursuing Green Hydrogen?

- Under the Paris Agreement of 2015, India is committed to reducing its greenhouse gas emissions by 33-35% from the 2005 levels.
- It is a legally binding international treaty on climate change to limit global warming to below 2°C compared to pre-industrial levels.
- At the 2021 Conference of parties in Glasgow, India reiterated its commitment to move from a fossil and import-dependent economy to a net-zero economy by 2070.
- India's average annual energy import bill is more than \$100 billion.
- The increased consumption of fossil fuel has made the country a high carbon dioxide (CO<sub>2</sub>) emitter, accounting for nearly 7% of the global CO<sub>2</sub> burden.
- To become energy independent by 2047, the government stressed the need to introduce green hydrogen as an alternative fuel that can make India the global hub and a major exporter of hydrogen.

#### 5. Auto Sector- Fuel Cells

- Hydrogen is an energy carrier, not a source of energy. Hydrogen fuel must be transformed into electricity by a device called a fuel cell stack before it can be used to power a car or truck. A fuel cell converts chemical energy into electrical energy using oxidizing agents through an oxidation-reduction reaction. Fuel cell-based vehicles most commonly combine hydrogen and oxygen to produce electricity to power the electric motor on board. Since fuel cell vehicles use electricity to run, they are considered electric vehicles (EVs).
- Inside each fuel cell, hydrogen is drawn from an onboard pressurized tank and made to react with a catalyst, usually made from platinum. As the

hydrogen passes through the catalyst, it is stripped of its electrons, which are forced to move along an external circuit, producing an electrical current. The current is used by the electric motor to power the vehicle, with the only byproduct being water vapor.

- Hydrogen fuel cell cars have a near-zero carbon footprint. Hydrogen is about 2-3 times as efficient as burning petrol because an electric chemical reaction is much more efficient than combustion.

### GS III: Science & technology

## GENE THERAPY

### 1. Why in the news?

Scientists in the United Kingdom testing a new form of cancer therapy, reported success in a teenaged girl, Alyssia, with a form of cancer called T-cell acute lymphoblastic leukaemia.

### 2. About T-cell acute lymphoblastic leukaemia

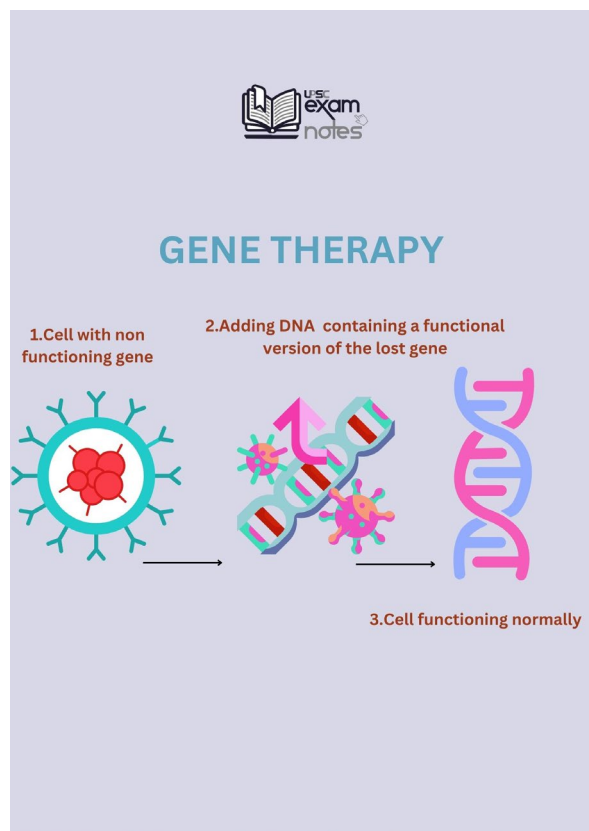
In this form of blood cancer, the T-cells, which are a class of white blood cells, equipped to hunt and neutralise threats to the body, turn against the body and end up destroying healthy cells that normally help with immunity.

The disease is rapid and progressive and is usually treated by chemotherapy and radiation therapy

### 3. About 'Base editing'

- A person's genetic code is several permutations of four bases: Adenine (A), Guanin (G), cytosine (C) and thymine (T)
- Sequences of these bases, akin to letters in the alphabet, spell out genes that are instructions to produce the wide array of proteins necessary for the body's functions.
- In Alyssia's case, her T-cells perhaps because of a mix arrangement in the sequence of bases had become cancerous

- A way to correct this mis-arrangement could mean a healthier immune system.
- In the last two decades, the world of biomedical engineering has been enthused by a technique that allow genes to be altered and errors ‘fixed.’
- The most popular among these approaches has been the CRISPR-cas9 system
- Inspired by how certain bacteria defend themselves against viruses, by snipping out and storing pieces of their genes, the CRISPR-cas 9 system, consists of an enzyme that acts like molecular scissors
- It can be made to cut a piece of DNA at a precise location and a guide RNA can be used to insert a changed genetic code at the sites of incision
- While there are a few ways to effect such changes, the CRISPR-cas9 system is believed to be the fast, most versatile system to effect such gene editing.
- While still a nascent technology, base editing is reportedly more effective at treating blood disorders which are caused by so-called single point mutations, or when a change in a single base pair can cause terminal disease.



#### 4. How does base editing work for T-cell lymphoblastic leukaemia

The objective of the gene therapy in the case of T-cell leukemia was to fix her immune system in a way that it stops making cancerous T-cells.

Healthy T-cells were extracted from a donor and put through a series of edits. The first base edit blocked the T-cells targeting mechanism so it would cease attacking the Cancer body.

The second removed a chemical marking, called CD7, which is on all T-cells and the third prevented the cells being killed by a chemotherapy drug.

Finally, the T-cells were programmed to destroy all cells cancerous or protective with CD7 marked on it.

#### GS III: Science & technology



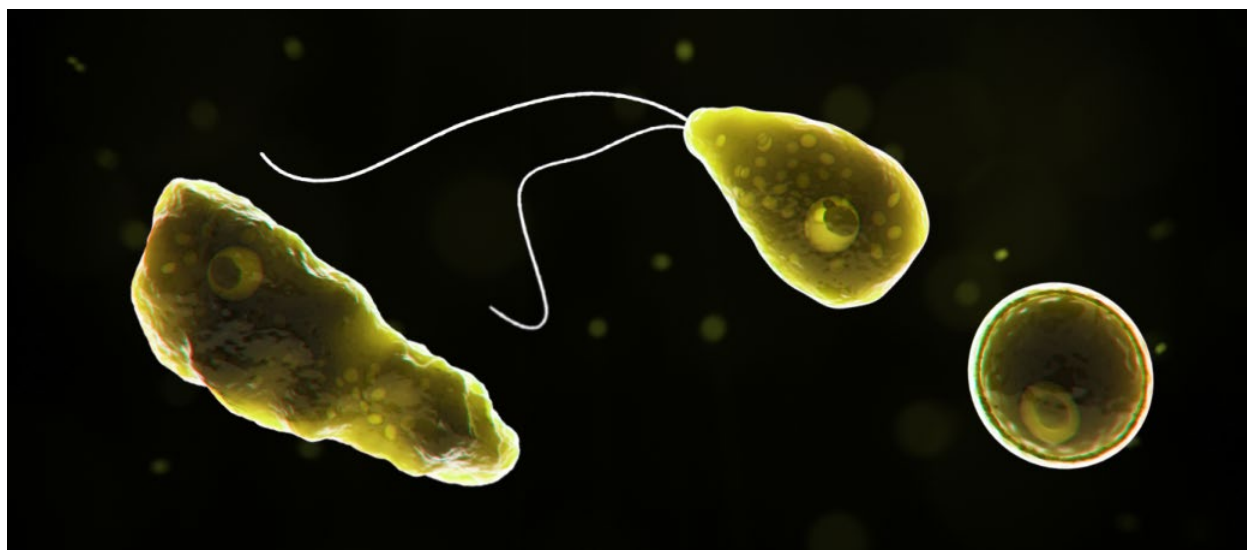
# NAEGLERIA FOWLERI

## 1. Context

South Korea reported its first case of infection from *Naegleria fowleri* or brain-eating amoeba. The authorities said a 50-year-old Korean national, who had recently returned from Thailand, died 10 days after showing symptoms of the rare yet fatal infection.

## 2. What is *Naegleria Fowleri*?

- *Naegleria* is an amoeba, a single-celled organism, and only one of its species called *Naegleria fowleri* can infect humans, according to the US Centers for Disease Control and Prevention (CDC).
- It was first discovered in Australia in 1965 and is commonly found in warm freshwater bodies such as hot springs, rivers, and lakes.



**Image Source: CDC**

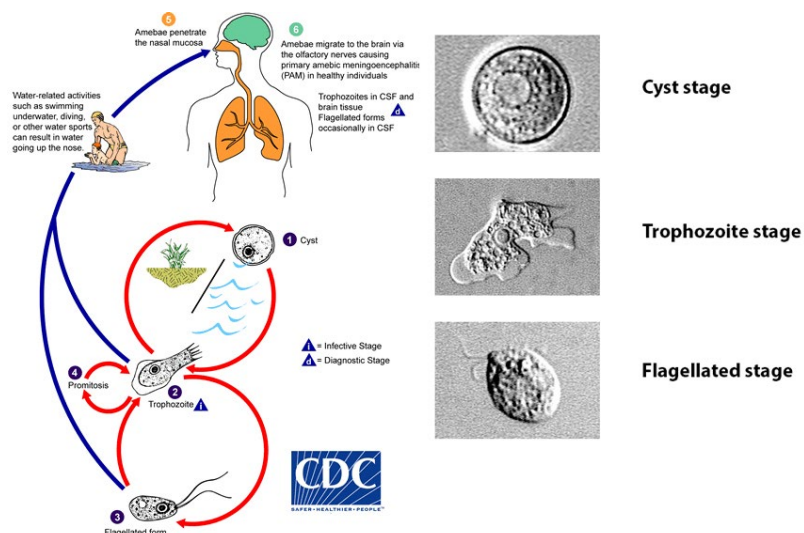


Image Source: CDC

### 3. How Does it infect humans?

- The amoeba enters the human body through the nose and then travels up to the brain.
- This can usually happen when someone goes for a swim, or dive or even when they dip their head in a freshwater body.
- In some cases, it was found that people got infected when they cleaned their nostrils with contaminated water.
- Scientists haven't found any evidence of the spreading of *Naegleria fowleri* through water vapour or aerosol droplets.
- Once *Naegleria fowleri* goes to the brain, it destroys brain tissues and causes a dangerous infection known as primary amebic meningoencephalitis (PAM), according to the CDC.

### 4. Symptoms of PAM(Primary amebic meningoencephalitis)

- The CDC says the first signs of PAM start showing within one to 12 days after the infection.
- In the initial stages, they might be similar to symptoms of meningitis, which are headache, nausea, and fever.

- In the later stages, one can suffer from a stiff neck, seizures, hallucinations, and even coma.
- The US public health agency also observed that the infection spreads rapidly and on average causes death within about five days.
- The fatality of PAM is as such that only four people have survived out of 154 known infected individuals in the United States from 1962 to 2021.

### 5. Treatment for the infection

- As the *Naegleria fowleri* infection is rare and progresses quickly, scientists have not been able to identify any effective treatments yet.
- At present, doctors treat it with a combination of drugs, including amphotericin B, Azithromycin, fluconazole, rifampin, miltefosine, and dexamethasone.

### 6. Can climate change increase the spread of the infection?

- According to the CDC, with the rising global temperatures, the chances of getting *Naegleria fowleri* infection will go up as the amoeba mainly thrives in warm freshwater bodies.
- The organism best grows in high temperatures of up to 46°C and sometimes can survive at even higher temperatures.
- Various recent studies have found that excess atmospheric carbon dioxide has led to an increase in the temperature of lakes and rivers.
- These conditions provide a more favorable environment for the amoeba to grow.
- So far, *Naegleria fowleri* has been found in all continents and declared as the cause of PAM in over 16 countries, including India.

## GS III: Science & technology

# DEEPFAKES

## 1. Context

Disinformation and hoaxes have evolved from mere annoyance to warfare that can create social discord, increase polarization, and in some cases, even influence the election outcome. Nation-state actors with geopolitical aspirations, ideological believers, violent extremists, and economically motivated enterprises can manipulate social media narratives with easy and unprecedented reach and scale. The disinformation threat has a new tool in the form of deep fakes.

## 2. What are Deepfakes

- Deepfake is a type of synthetic media in which a person in an already-existing video or image is replaced with another person. It manipulates the audio/video, which has the propensity to the device, using machine learning and artificial intelligence.
- Due to the ease with which bogus news, celebrity pornographic content, etc. get shared online, it has drawn attention.
- It makes a fake version of original or real audio-visual content by superimposing a new audio or image over an existing media file.
- In September 2019, the AI company Deeprance discovered 15,000 deep fakes videos online-nearly tripling in just nine months. A starting 96% of them were pornographic, and 99% of them matched the faces of famous women to porn actors.
- Deepfakes can be used to damage reputation, fabricate evidence, defraud the public, and undermine trust in democratic institutions.
- All this can be achieved with fewer resources, with scale and speed, and even microtargeted to galvanize support.

## 3. How did Deepfakes Work?

- Deepfake content is created by using two competing AI algorithms- one is called the generator and the other is called the discriminator.
- The discriminator is tasked with determining if the fake multimedia content produced by the generator is real and manufactured.
- A generative adversarial network is created when the generator and discriminator work together (GAN). Every time the discriminator correctly

recognizes the content as being fake, it gives the generator important insights into how to make the next deep fakes better.

- The first step in establishing a GAN is to identify the desired output and create a training dataset for the generator.
- Video clips can be supplied to the discriminator after the generator starts producing output at a level that is acceptable.

#### 4. Who are the Victims?

- The first case of malicious use of deep fake was detected in pornography. According to sensity.ai, 96% of deepfakes are pornographic videos, with over 135 million views on pornographic websites alone. Deepfake pornography exclusively targets women.
- Pornographic deepfakes can threaten, intimidate, and inflict psychological harm. It reduces women to sexual objects causing emotional distress, and in some cases, leading to financial loss and collateral consequences like job loss.
- Deepfake could act as a powerful tool by a malicious nation-state to undermine public safety and create uncertainty and chaos in the target country. Deepfake can undermine trust in institutions and diplomacy.

#### 5. Challenges with Deepfake

- Deepfake causes financial fraud, which poses problems for the entire financial system.
- In the era of the threat of fake news, it also poses a threat to the security of cyber systems and the validity of online registration.
- Deepfakes in phishing efforts would make it more challenging for people to recognize a hoax.
- In any nation, deep fakes can be used to sabotage democratic procedures like elections.
- The potential for harm to people, organizations, and societies is enormous since it can be used to generate phony pornographic videos and make politicians appear to say things they did not.

- Any genuine evidence of a crime can be easily discounted as false because the public is so distrustful due to the prevalence of deep fakes.
- Fake movies are likely to become more popular outside the world of celebrities as new technology enables unskilled people to create deep fakes with just a few images. This will feed the growth of revenge porn.
- The use of fake identities and impostor frauds in cybercrime is rising.

## 6. What is the Solution?

- Media literacy efforts must be enhanced to cultivate a discerning public. Media literacy for consumers is the most effective tool to combat disinformation and deep fakes.
- We also need meaningful regulations with a collaborative discussion with the technology industry, Civil society, and policymakers to develop legislative solutions to disincentivize the creation and distribution of malicious deepfakes.
- Social media platforms are taking cognizance of the deepfake issue, and almost all of them have some policy or acceptable terms of use for deepfakes.
- We also need easy-to-use and accessible technology solutions to detect deepfakes, authenticate media, and amplify authoritative sources.

## GS III: Science & technology

# VOICE TECHNOLOGY

## 1. Context

Bank and cyber frauds in India are on the rise. According to data from the Reserve Bank of India, frauds have cost the country an estimated 100 crore a day over the last seven years. The frauds reported in 2021-22 were 23.69% higher than in the previous year (9,103 cases reported compared there was a decline in the amount involved).

## 2. Voice Technology

- An emerging technology, it uses the unique characteristics of a person's voice as identification. The technology creates a digital voice print and compares it to a caller's voice.
- Voice authentication can significantly improve security over knowledge-based authentication methods, which fraudsters have exploited to scam people.
- One way to reduce losses is by adopting Voice Technology( VT), which encompasses voice biometrics or voice/speech recognition technology.
- The global adoption of smartphones has led to a dramatic increase in biometrics for security. However, these methods are cumbersome, not entirely secure, and vulnerable to deep fakes.
- With banks and establishments looking for ways to reduce fraud and identity theft risks, one of the best ways to do this is through the use of voice biometrics.
- Compared to other biometrics, voice use is the cheapest technology, and does not require a reader or special device. It is also non-invasive, and portable and affords remote identification.
- Banks have traditionally relied on the use of passwords, passwords are the weakest link in security (81% of hacking-related breaches involve weak passwords).
- Unlike a password, a customer's voice is impossible to spoof or copy and is far more challenging to hack.
- Voice Technology verifies a caller swiftly in seconds by analyzing the caller's voice and fags suspicious calls.
- Voice Technology allows privacy because it does not require users to reveal personal information.

## 3. Applications of Voice Technology

**Health care-** It can provide personalized medicine and x-ray readings. Personal health care assistants can act as life coaches, reminding you to take your pills, exercise, or eat healthier.



**Manufacturing-** AI can analyze factory IoT data as it streams from connected equipment to forecast expected load and demand using recurrent networks, a specific type of deep learning network used with the sequence of data.

**Home automation-** It can interact with smart home appliances and run the show. Eg: Marvel comic-based Iron man's virtual assistant Jarvis.

**Food ordering-** Voice assistant can be used to order food just by voice command. Eg-Many companies have collaborated with Alexa and their website support Alexa like Domino's Pizza hut, Starbucks, etc.

**Entertainment-** Voice assistant can recognize the command and play music. Ex- Alexa, Siri can play music from streaming services such as Apple Music and Google Play Music from a phone or tablet. Also allows the user to hear updates on supported sports teams.

**Messaging and Email-** Voice assistants can help in sending text messages and Emails without any need for physical interference. Ex: Messages can be sent from one Alexa application to another as well as Echo devices.

**Weather-** It can help in controlling indoor temperature depending on the command given. It can also provide weather reports.

**Operating appliances-** It can help in operating appliances at home like making coffee, switching on/off lights, and also probably parking cars, among others.

#### 4. Way forward

Voice biometrics tech is making waves in the world of fraud protection by providing an extra layer of protection for data. Although the technology is not yet perfect, the potential benefits are significant.

While the technology still has a long way to go to deliver super smart assistants, it is clear it's no longer the joke it used to be when it was launched. Moreover, with the rise of artificial intelligence and the Internet of Things (IoT), they will become even more advanced and better at helping their users handle their daily tasks.

### GS III: Science & technology

## NASAL VACCINE

### 1. Context

Bharat Biotech's **COVID-19 recombinant nasal vaccine** has been approved by the Ministry of Health's Central Drugs Standard Control Organisation for primary immunisation of those aged 18 years and above in emergencies

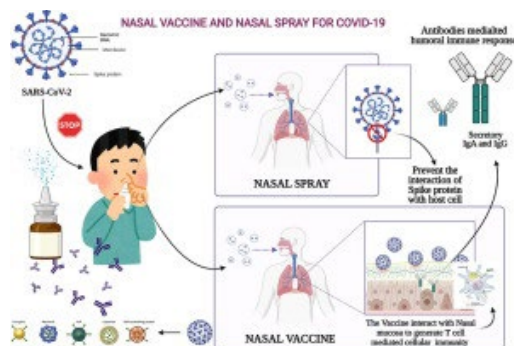
### 2. What is a nasal vaccine

Vaccines are usually given through different routes, with the most common being injectable shots delivered into the muscles (intramuscular) or the tissue just between the skin and the muscles (subcutaneous).

There are also other routes of delivery, especially in some vaccines for infants, that include administering the liquid solution orally instead of injecting

In the intranasal route, the vaccine is sprayed into the nostrils and inhaled.

Many viruses, including the coronavirus, enter the body through mucosa-wet, squishy tissues that line the nose, mouth, lungs and digestive tract triggering a unique immune response from cells and molecules there.



**Image Source: Science Direct**

### 3. How does a nasal vaccine work

In the case of both delivery routes, vaccines trigger a response in the blood.

B cells, for example, would churn out antibodies including a particularly potent disease-fighter called IgG to roam the body in search of the virus

Other cells, called T cells, would either help B cells produce antibodies or seek out and destroy the infected cells.

But vaccines that are injected through the nose or mouth also tap into another set of immune cells that hang around mucosal tissues.

The B cells that reside there can make another type of antibody, called IgA, which plays a key role in destroying airway pathogens.

In addition, the T cells that are residing nearby will be able to memorise the pathogens that they encountered and will lifelong scout the areas where these were first encountered.

### 4. Importance of nasal vaccine

These vaccines aim to overcome potential difficulties with mass vaccination and reduce the cost by doing away with the need for needles and syringes

Intranasal vaccines are also expected to cut down on the dependence on various trained personnel to administer the vaccine

### GS III: Economy

## FACTORS OF PRODUCTION

### 1.Introduction

Factors of production are resources that are thought to be the basic building blocks of production in any economy.

Land, labour, and capital are widely considered to be the three main factors of production.

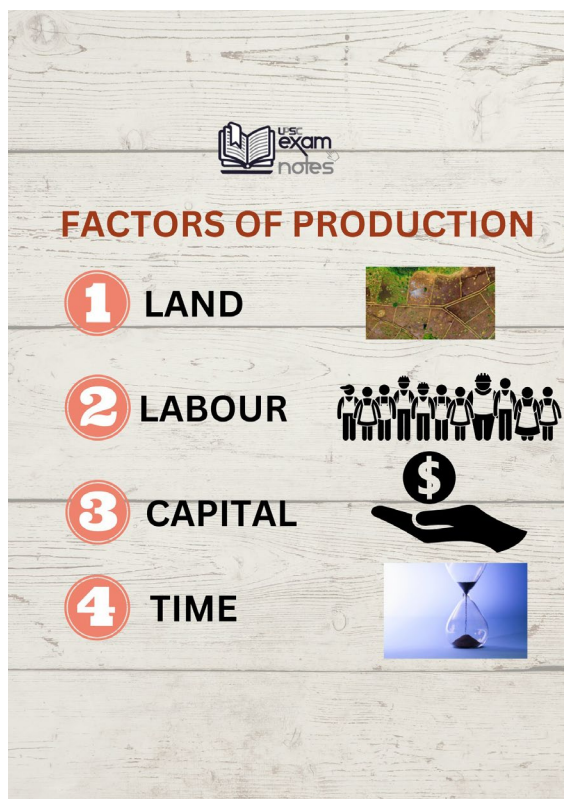
### 2.Factors of production

#### 2.1.OrthodoxEconomists

- i. The factors of production are considered to be basic inputs that are absolutely necessary for the production of any good or service that is useful to final consumers.
- ii. Take the case of something as simple as a burger, The production of burgers requires real estate and raw materials (land), the efforts of a number of workers (labour), and culinary equipment (capital)
- iii. In fact, such mixing of land, labour, and capital can be seen at various stages of the production process of any good in the modern economy.
- iv. Entrepreneurship is also considered by many to be the fourth factor of production
- v. It is believed to be the most crucial factor of production that brings together the other three factors.
- vi. In fact, many believe that other factors of production would be rendered useless without entrepreneurship

## 2.2.Heterodox economists

- Heterodox economists, however, consider land, labour, and time to be the three primary factors of production.
- They believe capital and entrepreneurship to be secondary factors of production in the sense that these factors are derived by first combining land, labour, and time.
- In the modern economy, physical capital such as machines, for instance, are produced by first mixing land and labour over a certain period of time
- Only after this happens do we see capital being brought to life and used to produce other intermediate or final goods and services
- Similarly, these economists argue, entrepreneurship which involves an element of uncertainty can also be seen as the product of mixing the three primary factors of production, namely land, labour, and time
- The role of the entrepreneur involves dealing with uncertainties that mire the production process
- This element of uncertainty is brought into the picture by time, which is necessarily involved in the production of any good or service
- Some individual or group of entrepreneurs usually take the risk of investing money in the present moment and then wait to reap the rewards of the investment some time in the uncertain future
- An entrepreneur's ideas can be considered fundamentally to be a form of labour as well
- And the real estate and other materials the entrepreneur personally uses for work can be classified as land



### 3.Ownership (Public or Private)

- The ownership of the factors of production has been a matter of intense debate among thinkers belonging to different schools of economic thought over many centuries
- Marxist economists, for instance, have long argued that the factors of production need to be collectively owned by the state
- This was the driving philosophy behind centrally planned economies like the erstwhile Soviet Union in contrast to economies like the United States where factors of production are largely owned by private individuals or groups
- Marxists believe that private ownership of the factors of production leads to the exploitation of labour supplied by the working class and the mismanagement of scarce resources
- They argue that state planners, on the other hand, can overcome both these problems by framing a proper collective economic plan

- Economists from various free market schools of thought, however, strongly believe in the private ownership of all factors of production in an economy
- They argue that private ownership offers resource owners the incentive to use the factors of production most efficiently, both in terms of avoiding unnecessary wastage and extracting the most value out of limited resources

### GS III: Economy

## RURAL UNEMPLOYMENT

### 1.Context

The year 2022 ended with 8.3 per cent of the job seekers in India being unemployed. The rate of unemployment in the urban area was 10 per cent and the rural unemployment rate was 7.7 per cent on December 31, 2022

### 2.Key takeaways

- The data was released by the Centre for Monitoring Indian Economy (CMIE) that calculates and publishes the country's unemployment rate on a daily basis
- The unemployment rate is a ratio of the total estimated unemployed persons to the total estimated labour force for a month
- The rate of urban unemployment generally remains higher than rural. But the latter is considered more severe mainly because the causes of rural unemployment are more deep-rooted and hence, are more difficult to address, compared to urban unemployment
- The central Indian belt is characterised by undulating terrain, absence of perennial streams, people's dependency on the forest for daily life and lack of irrigation infrastructure, which make it the worst-affected region in terms



of rural employment generation. This area is also the heartland of the Adivasi people

### 3.Factors

Factors such as decreasing land holding size, lack of infrastructure especially irrigation infrastructure, lack of other job opportunities and continuous depletion of forest resources are considered the main reasons for rural unemployment. These are either irreversible or difficult to change overnight

#### 3.1.Low holding size

- Agriculture Census 2015-16 by the department of agriculture & farmers welfare, Government of India showed that the average size of operational holdings decreased to 1.08 hectares in 2015-16 from 2.28 hectares in 1970-71
- The marginal (less than 1 hectare land) farmers constitute more than 68.5 per cent of the total cultivators and their average holding size is 0.38 ha.
- This situation is even worse in the central plateau area, The percentage of marginal farmers is more within Adivasi communities
- Around 77 per cent in Jharkhand and 76 per cent in Odisha are marginal farmers, a recent report on the Status of Adivasi Livelihoods (SAL 2021) in the two states by PRADAN, a national-level non-profit, showed.
- This minuscule amount of land can't employ all the labour forces in the households beyond the Kharif (monsoon) season unless there are irrigation facilities for a second crop
- Even in the Kharif season, the entire labour force of the household is not fully deployed. As a result, most marginal farmers look for wage employment as agricultural labour during the Kharif season as well.

#### 3.2.Lack of irrigation facilities

- i. Around 49 per cent of the net sown area in India is irrigated, the agriculture census report showed. For marginal farmers' land, it is around 54 per cent
- ii. Around 19 per cent of Adivasi lands in Jharkhand and only 7 per cent of Adivasi lands in Odisha have all-season irrigation facilities, SAL 21 showed.

- iii. The usual irrigation models such as large dam or river lift irrigation schemes are either not feasible or not beneficial to marginal farmers
- iv. In-situ water harvesting, soil moisture conservation, small diversion structures, among others are some of the alternative solutions
- v. There is, however, a need for developing context-specific irrigation prototypes for different areas within the central plateau

### **3.3.Lack of other work opportunities**

- a. There has been a 48 per cent increase in the total production of food grains in the last 20 years, according to data shared by the Press Information Bureau, Union Ministry of Agriculture & Farmers Welfare
- b. Increased food production, no doubt, has created jobs in the agriculture sector in rural areas
- c. However, that increase in production has not at all been sufficient to absorb the entire rural workforce
- d. Mechanisation and increase of rural population by 17 per cent during the same period have created more unemployment in the rural areas.
- e. The lack of employment opportunities forces villagers to migrate to cities in search of menial jobs. The Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) was enacted to give employment opportunities to rural employment seekers.
- f. But gradually, the focus of MGNREGA shifted to asset creation and as a result, it became more supply-driven rather than catering to the employment demand of job seekers in the rural area.
- g. The low wage rate of MGNREGA was another issue. In many states, the MGNREGA wage rate was lower than the state's minimum wage rate

### **3.4.Depleting forest resource**

Forests have been a major source of employment for villages in central India. Apart from working for the forest department as labourers, villagers collect and sell various non-timber forest products from the forest. Since the colonial era, the forest department's exclusive focus on timber species has negatively affected the non-timber tree species in the forests

The availability of non-timber forest products is declining, the SAL 21 report showed.

#### 4. Way forward

Because of the above factors, rural unemployment in India is chronic, especially in central India. Changing this situation, therefore, needs careful planning and sustained action on a long-term basis.

A key strategy may be to create irrigation infrastructure and bring more areas of small and marginal farmers under a second crop

However, this needs long and intensive engagement to develop context-specific prototypes for water harvesting and irrigation in the central plateau region

The focus of MGNREGA has to be re-shifted to employment generation Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 has to be implemented in its right spirit

The Adivasis and other forest-dwelling communities should get the right to protect, regenerate, conserve or manage any community forest resource for sustainable use.

### GS III: Economy

## BAD LOANS

### 1. Context

In December 2022, Finance Minister Nirmala Sitharaman told Parliament that banks had written off bad loans worth ₹10, 09, 511 crores during the last five financial years.

A National Asset Reconstruction Company Ltd. (NARCL) was announced in the Union Budget for 2021-2022 to resolve stressed loans amounting to about ₹ 2 lakh crores in phases.

### 2. About Bad Loan

- A bad loan has not been 'serviced' for a certain period.
- Servicing a loan is paying back the interest and a small part of the principal depending on the agreement between the bank and borrower, to begin with, so that over time, you pay back the principal as well as the interest accrued in the duration.
- In 2009, the RBI brought out norms that set out categories of NPAs and what banks must do as these bad loans age.
- Bad loans are a problem for, with time, there is less and less certainty that the loan would be paid back in full.

### 3. RBI's circular

- The RBI's master circular in 2009 started off the journey of NPA recognition.  
It states that if an asset has been 'doubtful' for a certain period, the value of that asset must be provided for in parts, as the asset ages.
- There was a revision in October 2021 which made recognition far more stringent. Interestingly, even if the asset is standard and there is no problem with it, banks are expected to make provisions depending on the risk element for that sector.
- Home loans with teaser rates are at greater risk than those that are not.
- Hence provisions have to be made for such loans.

### 4. Recongisation of NPAs

- In the banking system, the government and regulatory authorities need to have a good view of how healthy the financial system is A weak financial system can eventually ruin lives and livelihoods.
- Unless we know we have a problem fixing it.
- India became more aggressive in recognising loans as "bad" in the 2014 to 2015 period.
- The periodic asset quality review was introduced. Further, the regulator stepped in to prevent the evergreening of loans (i.e. lending more to an already stressed asset in the hope that it could be brought back to its feet).

- With the transparent recognition of NPAs, this percentage for gross loans rose from 4.1 per cent in March 2014 to 11.46 per cent in March 2018.
- She said that with the government's strategy of recognition, resolution, recapitalisation and reforms.
- NPAs had since declined to 5.9 per cent by March 2022.

## 5. Recovery of loans

- Minister of State for Finance told the Rajya Sabha in December that loans written off by scheduled commercial banks (SCBs) during the last five financial years totalled ₹ 10.1 lakh crores.
- Significantly, only ₹1.32 lakh crore has been recovered.
- As a percentage of write-offs, this comes to only about 13 per cent.
- One explanation is that if an NPA is fully recognised in a particular year, even the fastest legal process may not resolve for full repayment.
- Not only do banks take significant haircuts when it comes to recovery but the amount to be repaid post-haircut may be delayed.
- Time will tell whether recoveries would eventually improve.

## GS III: Environment & ecology

# SARSA RIVER POLLUTION

## 1. Context

As Sikhs across India and the rest of the World observe the 356th Birth Anniversary of Guru Gobind Singh, a rivulet in north India associated with a key moment in his life is gasping for breath.

## 2. Key Points

- The Sarsa was where the Guru's family got separated in the winter of 1704, never to be together again.

- The rivulet is thus important in Sikh Consciousness. But one of India's largest manufacturing hubs located near it has made the water completely unfit for human consumption.
- Pharmaceutical waste being discharged either directly or indirectly into the Sarsa from the Baddi-Barotiwala-Nalagarh (BBN) industrial complex has affected the River's biota and made the lives of people living along its banks difficult.
- The pharma waste could also be causing the area to become prone to antimicrobial resistance which is a ticking time bomb.

### 3. Sarsa River

- The Sarsa originates in the Shivalik hills in Himachal Pradesh.
- It flows through Solan district borders Punjab, enters Rupnagar district in Punjab and eventually flows into the Sutlej.
- On December 21, 1704, a pitched battle had taken place on the banks of the Sarsa between the Khalsa and Mughal armies.



**Image source: Wikipedia**

#### 4. Pollution in the River Sarsa

- The BBN complex is spread over 380 square kilometres in the Solan district near the Sarsa.
- BBN hosted around 500 small, medium and large pharma units and accounted for 35 per cent of Asia's total medicine production.
- The rapid industrialisation and a lax attitude towards safe disposal and management of pharma waste have raised concerns about the effects of pollution on the environment and health.
- The water of the Sarsa river, which flows downstream through Baddi is **black and emanates a foul odour**.
- The collected water samples from the Sarsa river by covering a stretch of 20 km from four sampling spots, before and after the amalgamation of Common Effluent Treatment Plant treated pharmaceutical effluents into river water samples.

The impact of concentration of heavy metals (Cadmium, Manganese, cobalt, lead, copper, zinc and iron) and identify the most contaminated sampling spot responsible for heavy metal contamination in river water samples.

- The concentration of each heavy metal was within the permissible limits before amalgamation and dwindled gradually after amalgamating pharmaceutical effluents into the river water samples.

#### 5. Guidelines to prevent pollution

- The Water (Prevention and Control of Pollution) Act, of 1974 lays down guidelines about the penalties to be imposed on those who are polluting water resources.
- Those who pollute water are liable for a prison sentence of up to six years under the Act.
- There is also the Air (Prevention and Control of Pollution) Act of 1981 which has to be followed.

### Mains corner

1. What are centrally protected monuments and discuss the significance of protecting it. (250 words)
2. What are heat domes and discuss the relationship between heat domes and jet streams. (250 words).
3. What were the initial objectives of INC at the time of its inception. Discuss the factors which led INC to embark upon freedom fight journey (250 words)
4. What was the Bhima Koregaon Battle and why is the battle significant for Dalit Rights? (250 words)
5. How proposals of delimitation commission in J&K and the north east ensure greater fairness and balance? (250 words)

### Prelims Corner

1. A new *Indian Army Memorial*, commemorating the sacrifice of millions of Indian soldiers who fought for the British during the two World Wars is set to be built in:

- A) London    B) Manchester    C) Glasgow    D) Liverpool

Answer (C)

A new British Indian Army Memorial, commemorating the sacrifice of millions of Indian soldiers who fought for the British during the two World Wars, is set to be built in the Scottish city of Glasgow. The memorial is visualised as Scotland's first permanent memorial wall to recognise the service and sacrifice of the British Indian Army during the world wars.

2. With reference to the *Bomb Cyclone*, consider the following statements:

1. What defines a bomb cyclone is how rapidly the pressure rises in the low-pressure mass.



2. This quickly decreases the pressure difference, or gradient, between the two air masses, therefore making the winds stronger.

Which of the above statements are incorrect?

A) Only 1   B) Only 2   C) Both 1 and 2   D) Neither 1 nor 2

Answer (C)

Both are incorrect.

The storm pummeling large swaths of the United States and Canada is what forecasters call a “bomb cyclone.” While this kind of storm is not exceedingly rare, this one is very strong, with high winds that are bringing heavy snow or rain to many areas.

Storms can form when a mass of low-pressure air meets a high-pressure mass. The air flows from high pressure to low, creating winds. What defines a bomb cyclone is how rapidly the pressure drops in the low-pressure mass — by at least 24 millibars in 24 hours. This quickly increases the pressure difference, or gradient, between the two air masses, making the winds stronger. This process of rapid intensification has a name: bombogenesis.

As the winds blow, the rotation of the Earth creates a cyclonic effect. The direction is counterclockwise in the Northern Hemisphere (when viewed from above).

3. With reference to the *Indian National Congress (INC)*, consider the following statements:

1. On December 28, 1885, 72 social reformers, journalists and lawyers congregated for the first session of the INC at Gokuldas Tejpal Sanskrit College, Bombay.

2. In the beginning, the aim of this group was not to demand independence from the ongoing colonial rule but to influence the policies of the British government in favour of Indians.

3. In Surat in 1906, the divisions between the ‘moderates’ led by Gopal Krishna Gokhale and Surendranath Banerjea, and the ‘extremists’ led by Bal Gangadhar Tilak came to the fore and there was a split.

4. In 1915, the Bombay session saw the ‘moderates’ and the ‘extremists’ groups coming together again as one.

How many of the above statements are true?

- A) Only one of the above statements
- B) Only two of the above statements
- C) Only three of the above statements
- D) All of the above statements

Answer (D)

All of the statements are true.

4. Which of the following statements are not true with reference to the process of *Delimitation* ?

- A) Delimitation is carried out by an independent Delimitation Commission appointed by the Election Commission of India.
- B) The draft proposals of the Delimitation Commission are published for public feedback.
- C) Under Article 82, Parliament is to enact a Delimitation Act after every Census.
- D) In the history of the Indian republic, Delimitation Commissions have been set up four times.

Answer (A)



Delimitation is carried out by an independent Delimitation Commission, appointed by the Government of India under provisions of the Delimitation Commission Act. The Delimitation Commission is appointed by the President of India and works in collaboration with the Election Commission of India. It is composed of the following: a retired Supreme Court judge, the Chief Election Commissioner of India and respective State Election Commissioners.

5. Which country recently approved a cabinet decree which imposes tougher rules on charity ships that rescue migrants at sea?

A) Germany    B) Italy    C) Poland    D) Denmark

Answer (B)

On Wednesday (December 28), Italy's far right government approved a cabinet decree which imposes tougher rules on charity ships that rescue migrants at sea, reported Reuters. These rules will make it harder for such ships to rescue as many migrants as possible – with severe penalties in cases of non-compliance.