

SCIENCE AND TECHNOLOGY

❖ **Narco test**

❖ **CONTEXT:** A court in Saket, New Delhi, has allowed Delhi Police to conduct a narco test on Aaftab Poonawalla, the 28-year-old man accused of killing his 27-year-old live-in partner Shraddha Walkar in May 2022.

- After police moved court seeking permission for the test, accused consented, telling the judge he was aware of the consequences.

➤ **What is a narco test?**

- In a 'narco' or narcoanalysis test, a drug called sodium pentothal is injected into the body of the accused, which transports them to a hypnotic or sedated state, in which their imagination is neutralised. In this hypnotic state, the accused is understood as being incapable of lying, and is expected to divulge information that is true.
- Sodium pentothal or sodium thiopental is a fast-acting, short duration anaesthetic, which is used in larger doses to sedate patients during surgery. It belongs to the barbiturate class of drugs that act on the central nervous system as depressants.
- Because the drug is believed to weaken the subject's resolve to lie, it is sometimes referred to as a "truth serum", and is said to have been used by intelligence operatives during World War II.

➤ **Is this the same as a polygraph test?**

- A polygraph test is based on the assumption that physiological responses that are triggered when a person is lying are different from what they would be otherwise.
- A polygraph test does not involve injecting drugs into the body; rather instruments like cardio-cuffs or sensitive electrodes are attached to the suspect, and variables such as blood pressure, pulse rate, respiration, change in sweat gland activity, blood flow, etc., are measured as questions are put to them.
- A numerical value is assigned to each response to conclude whether the person is telling the truth, is deceiving, or is uncertain.
- A test such as this is said to have been first done in the 19th century by the Italian criminologist Cesare Lombroso, who used a machine to measure changes in the blood pressure of criminal suspects during interrogation.
- Similar devices were subsequently created by the American psychologist William Marston in 1914, and by the California police officer John Larson in 1921.

➤ **But why should tests such as these be done?**

- In recent decades, investigating agencies have sought to employ these tests in investigation, which are sometimes seen as being a "softer alternative" to torture or "third degree" to extract the truth from suspects.
- However, neither method has been proven scientifically to have a 100% success rate, and remain contentious in the medical field as well.

➤ **Are there no restrictions on putting accused through these tests?**

- In 'Selvi & Ors vs State of Karnataka & Anr' (2010), a Supreme Court Bench comprising then Chief Justice of India K G Balakrishnan and Justices R V Raveendran and J M Panchal ruled that no lie detector tests should be administered "except on the basis of consent of the accused".
- Those who volunteer must have access to a lawyer, and have the physical, emotional, and legal implications of the test explained to them by police and the lawyer.
- The court ordered that 'Guidelines for the Administration of Polygraph Test on an Accused' published by the National Human Rights Commission in 2000, must be strictly followed. The subject's consent should be recorded before a judicial magistrate.

➤ **Can the results of these tests be considered as "confessions"?**

- Because those in a drugged-induced state cannot exercise a choice in answering questions that are put to them cannot be considered as confession.
- However, any information or material subsequently discovered with the help of such a voluntarily-taken test can be admitted as evidence.
- Thus, if an accused such as, the recent case, reveals the location of, say, a physical piece of evidence (which is often something like a murder weapon) in the course of the test, and police later find that specific piece of evidence at that location, the statement of the accused will not be treated as evidence, but the physical evidence will be treated as such.
- The Bench took into consideration international norms on human rights, the right to a fair trial, and the right against self-incrimination under Article 20(3) of the Constitution.
 - ✓ The apex court said "We must recognise that a forcible intrusion into a person's mental processes is also an affront to human dignity and liberty, often with grave and long-lasting consequences," observing that the state's plea that the use of such scientific techniques would reduce 'third degree' methods "is a circular line of reasoning since one form of improper behaviour is sought to be replaced by another".

➤ **In which recent criminal investigations have these tests been sought to be used?**

- The CBI had sought to give these tests to the driver and helper of the truck that hit the vehicle carrying the Unnao rape victim in Uttar Pradesh in July 2019.
- In May 2017, Indrani Mukerjea, who is facing trial for allegedly murdering her daughter Sheena Bora in 2012, had offered to undergo the lie detector test. The CBI refused, saying they already had sufficient evidence against her.
- Dr Rajesh Talwar and Dr Nupur Talwar, who were accused of killing their daughter Aarushi and help Hemraj in Noida in 2008, were given polygraph tests. A video of the narco test on their compounder, Krishna, was leaked to the media.

- In August 2019, the CBI wanted to conduct polygraph and narcoanalysis tests on a former staffer of Punjab National Bank (PNB), who was in custody in the alleged Rs 7,000-crore fraud involving the absconding jewellers Nirav Modi and Mehul Choksi. The manager, Gokulnath Shetty, declined consent.
- In October 2020, the UP government sought to conduct polygraph and narco tests as part of the investigation into the alleged gangrape and murder of a 19-year old Dalit woman by four men of the Thakur caste in Hathras. The victim's family refused.

PRELIMS

1. What is carbon border tax, which India opposed at COP27

❖ **CONTEXT: A group of countries including India has opposed the carbon border taxes policy at the COP27 in Sharm El Sheikh, saying it could "result in market distortion".**

- The BASIC group, comprising India, China, Brazil and South Africa, said in a joint statement dated November 15, "Unilateral measures and discriminatory practices, such as carbon border taxes, that could result in market distortion and aggravate the trust deficit amongst Parties, must be avoided. BASIC countries call for a united solidarity response by developing countries to any unfair shifting of responsibilities from developed to developing countries."
- The Carbon Border Adjustment Mechanism is a plan from the European Union (EU) to tax carbon-intensive products, such as iron and steel, cement, fertiliser, aluminium and electricity generation, from 2026.

➤ **What are carbon border taxes**

- The carbon border tax involves imposing an import duty on a product manufactured in a country with more lax climate rules than the one buying it.
- While its advocates, like the EU, claim the tax will benefit the environment and provide a level playing field to companies, those opposing it call the tax unfair and protectionist. They say it puts the burden of climate compliance on developing countries, when historically, they have done much less to pollute the environment and yet are often more vulnerable to effects of climate change.

➤ **'Carbon leakage': Why need for tax was felt**

- Some developed nations, in efforts to cut emissions, impose high costs on carbon-intensive businesses in their own countries.
- Businesses can potentially sidestep this simply by moving production to a country with less stringent rules, a practice called carbon leakage.

➤ **EU's Carbon Border Adjustment Mechanism**

- The EU came up with the Carbon Border Adjustment Mechanism in 2021.
- The European Commission's describes it thus, "Designed in compliance with World Trade Organization (WTO) rules and other international obligations of the EU, the CBAM system will work as follows: EU importers will buy carbon certificates corresponding to the carbon price that would have been paid, had the goods been produced under the EU's carbon pricing rules. Conversely, once a non-EU producer can show that they have already paid a price for the carbon used in the production of the imported goods in a third country, the corresponding cost can be fully deducted for the EU importer."

- On carbon leakage, EU says, "As raise climate ambition and less stringent environmental and climate policies prevail in non-EU countries, there is a strong risk of so-called 'carbon leakage' – i.e. companies based in the EU could move carbon-intensive production abroad to take advantage of lax standards, or EU products could be replaced by more carbon-intensive imports."

- The CBAM will equalise the price of carbon between domestic products and imports and ensure that the EU's climate objectives are not undermined by production relocating to countries with less ambitious policies."

- Apart from the EU, California in the US applies charges to some imports of electricity. Canada and Japan are also planning similar measures.

➤ **India's position**

- India has maintained that developed countries cannot push the burden of doing more to tackle climate change while they evade responsibilities themselves.
- At COP27, India said all fossil fuels needed to be phased down and not just coal, which has been targeted by the developed countries and which India is heavily reliant on.
- India argued in climate action, no sector, no fuel source and no gas should be singled out for action. In the spirit of the Paris Agreement, countries will do what is suitable as per their national circumstances."
- India also stressed that 'just transition' to cleaner sources of energy did not mean that all countries should strive for the same level of decarbonisation.
- For India, just transition means the transition to a low-carbon development strategy over a time scale that ensures food and energy security, growth, and employment, leaving no one behind in the process.

2. Pangong Tso Lake

❖ **CONTEXT: In order to patrol the Pangong Tso Lake in Eastern Ladakh, the Army has installed new landing docks and speed boats in a manner similar to that of the Chinese. The lake is located at a height of about 14,000 feet.**

- This is a component of an overarching capability improvement and infrastructure-building initiative India has undertaken since the 2020 standoff in Eastern Ladakh to fill gaps and keep up with Chinese construction along the Line of Actual Control (LAC).
- The induction has given huge impetus to our patrolling capability and we now have boats that match the adversary.
- The landing craft can accommodate 35 soldiers or a vehicle and 12 people, while the speed boats can travel at 35 knots.

- For the landing craft and speed boats delivered in the second half of 2021, the Army secured two contracts in early 2021.
- A 65 crore contract for 12 specialized patrol boats with Goa Shipyard Limited (GSL) was signed at the end of December. Another Goa-based private firm was given the second contract for 17 troop-carrying, flat-bottom landing docks.

➤ **About**

- Pangong Tso is an endorheic or landlocked lake that is partly in India's Ladakh region and partly in Tibet.
- The name reflects the mixed heritage of the lake: Pangong in Ladakhi means extensive concavity, the word Tso is Tibetan for lake.
- It is an about 135-km long, thin lake that is shaped like a boomerang and is located at an elevation of around 4,270 m.
- Approximately one-third is in India and the remainder in China, with width varying from one to five km is a major obstacle.
- Its widest point is 6 km. Over 600 sq km make up its entire surface.
- The brackish water lake has mountain spurs of the Chang Chenmo range jutting down referred to as 'fingers'.
- Along its southern bank, there are also tall, shattered mountains that slope in the direction of Spangur Lake.
- Despite being perfectly pure, the lake's water is brackish, making it unsafe to drink.

➤ **Significance of the lake**

- The water body has enormous strategic significance since it offers a favorable setting for carrying out large-scale operations.
- In 1958, the People's Liberation Army (PLA) took control of Khurnak Fort. Later, in 1959, the PLA also built a camp near Maldo-Spangur Lake, south of Pangong Tso.
- Wintertime freezing of the lake permits some vehicular traffic on it as well.

3. **14% conviction in POCSO; in a fourth of cases, accused known to victims, says study**

❖ **CONTEXT: Ten years after the enactment of the Protection of Children from Sexual Offences (POCSO) Act, an analysis by an independent think-tank of cases under this legislation in eCourts across the country has found that 43.44 per cent of trials end in acquittals and only 14.03 per cent lead to convictions.**

- Besides, in 22.9 per cent of the 138 judgments analysed in detail by the initiative, the accused were known to the victims — they were family members in 3.7 per cent of the cases.
- In these cases, 18 per cent involved a "prior romantic relationship" while the relationship between the victim and accused was not identified in 44 per cent.
- The analysis, titled "A Decade of Pocso", was carried out by the Justice, Access and Lowering Delays in India (JALDI) Initiative at Vidhi Centre for Legal Policy, in collaboration with the Data Evidence for Justice Reform (DE JURE) program at the World Bank.
- It studied 230,730 cases from eCourts in 486 districts spanning 28 states and Union Territories for the period 2012 to 2021.
- According to data published by the National Crime Record Bureau (NCRB) in 2021, the accused was a person known to the victim in 96 per cent of cases filed under POCSO.
- In the 138 judgments analysed by the Vidhi initiative, 5.47 per cent victims were under 10 years of age, 17.8 per cent between 10-15 years and 28 per cent between 15-18 years. The age of victims in 48 per cent of the cases were not identified.
- Among the accused in these cases, 11.6 per cent were between 19-25 years of age, 10.9 per cent between 25-35 years, 6.1 per cent between 35-45 years and 6.8 per cent above 45 years — in 44 per cent of the cases, the age of the accused was not identified.
- Overall, the analysis shows that over 56 per cent of all POCSO cases correspond to offences of penetrative sexual assault (31.18 per cent) and aggravated penetrative sexual assault (25.59 per cent).

➤ **States and UTs data**

✓ **Acquittal and conviction**

- Among the states, acquittals were seven times more than convictions in Andhra Pradesh, and five-fold in West Bengal.
- "Andhra Pradesh shows a huge disparity between acquittal and conviction figures with 56.15 per cent of the total disposed cases ending in acquittals and only 7.25% convictions.
- In West Bengal too, acquittals (53.38 per cent) are nearly five times the conviction figures (11.56 per cent).
- The situation is different in Kerala where the gap between acquittal and conviction is not very high with acquittals constituting 20.5 per cent of the total cases and convictions constituting 16.49 per cent.

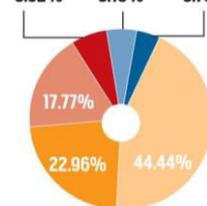
✓ **Pendency and Disposable**

- Delhi has the highest number of POCSO trials with 13.54 cases per 100,000 population in 2018.
- Five districts with the highest number of POCSO trials, pending and disposed, include Namchi in Sikkim, New Delhi, Central Delhi, Medak (Telangana) and West Garo Hills (Meghalaya).

POCSO CASES

Relationship between the victim & accused

5.92% 5.18% 3.70%



■ Cannot be ascertained
■ Known Person
■ Romantic Relationship
■ Stranger
■ Person in position of power
■ Family

- UP has the highest pendency with more than three-fourths (77.77 per cent) of the total cases filed between November 2012 and February 2021.
- At 80.2 per cent, Tamil Nadu has the highest disposal, but many of these cases were disposed of because of transfers.
- The study also found a sharp increase of 24,863 cases in the number of pending cases between 2019 and 2020 due to the Covid pandemic. Five districts with the highest pendency percentages include Lucknow, Hardoi, Badaun, Allahabad (UP) and Howrah (West Bengal).
- The study found that on an average, it takes 509.78 days for a case to be disposed of, whereas the POCSO Act stipulates that cases should be disposed of within a year.
- At 1284.33 days in 2020, Delhi had the highest average case length — the number of days an average case remained pending. “One of the primary reasons for this high pendency is the slow pace of investigation by the police and the delay in depositing samples with the Forensic Science Laboratories, investigation completed in less than 60 days only in 35 per cent of POCSO cases. For 36 per cent of the cases, it takes more than six months just to complete the investigation.
- A total of 22.76 per cent cases were “disposed” of by virtue of transfers from one court to another — “one-fifth of the cases in this dataset ended in transfers”, said the study. Since POCSO cases are supposed to be tried by special courts, the transfers indicate “either administrative mismanagement or wrongful appreciation of facts by the police.
- While the percentage of transfers out of total disposals was only around 8 per cent in 2013, it rose to a little over 19 per cent in 2019 and 42 per cent in 2020. “This is concerning because precious time is being wasted if the matter has to be transferred from one court to another and unnecessary delay is being caused in the trial process.
- According to the analysis, the average case length has increased from year to year in many states — Assam, Chhattisgarh, Gujarat, Karnataka, Tamil Nadu, West Bengal and Himachal Pradesh — indicating that most cases being disposed of are those pending for multiple years.
- Of the 22,625 cases disposed of in 2018, 45.63 per cent were done in less than one year, 29.67 per cent in one-two years, 13.54 per cent in two-three years and 11.16 per cent in more than three years.
- The proportion of cases disposed of in less than one year has gradually decreased – from over 60 per cent in 2016 to 42.07 per cent in 2018.
- The study has flagged that “support persons” are not being appointed in most cases, special courts have not been designated in all districts, and there is a lack of Special Public Prosecutors appointed specifically for POCSO cases.
- For instance, it said, as of 2022, 408 POCSO courts have been set up in 28 states as part of the Government’s Fast Track Special Court’s Scheme.
- Besides, the analysis shows, states like Chhattisgarh, Haryana, Kerala, Sikkim, Chandigarh and the NCT of Delhi seem to have a much higher reporting of cases when compared to the other states. Delhi has the highest reporting of POCSO cases in the country.

4. Mission Prarambh

❖ **CONTEXT:** India’s first privately developed launch vehicle, Vikram-S, blasted off on its maiden flight from the Indian Space Research Organisation’s (ISRO’s) Sriharikota spaceport on Friday (November 18). The mission, named Prarambh, or ‘the beginning’, marks the Indian private sector’s first foray into the promising space launch market.

➤ **Mission Prarambh, Vikram S Rocket: In the names of Sarabhai and Kalam**

- The rocket has been developed by Hyderabad-based Skyroot Aerospace, a company that was started in 2018. It is called Vikram-S. It is named after Vikram Sarabhai, the founder of India’s space programme.
- The Vikram-S rocket is a single-stage sub-orbital launch vehicle which will carry three customer payloads and help test and validate technologies in the Vikram series space launch vehicles.
- The company is designing three Vikram rockets that will use various solid and cryogenic fuels.
- The Vikram series of rockets are among the few launch vehicles that have their core structure built using carbon composites.
- The thrusters used for spin stability in the vehicle have been 3D printed.
- The engine used in the launch vehicle is named after former president Dr A P J Abdul Kalam. The performance of the ‘Kalam-80’ will be one of the key areas that the company will monitor during the flight of Vikram-S.

➤ **A suborbital first flight to test systems**

- Mission Prarambh will see Vikram-S carry three customer satellites in a sub-orbital flight. In a sub-orbital flight, the vehicle travels slower than the orbital velocity (which means it is fast enough to reach outer space, but not fast enough to stay in an orbit around the Earth). Tycoons Jeff Bezos and Richard Branson have undertaken sub-orbital flights to the edge of space.
- The recent flight will take less than five minutes. Vikram-S is a single stage solid fuel rocket meant to test nearly 80 per cent of all systems and processes before the launch of Vikram-I scheduled for 2023. Vikram-I will be a much larger vehicle that will undertake orbital flights.

➤ **On board, a satellite built by school kids**

- Vikram-S will carry three satellites, including one by SpaceKidz India called FunSat, parts of which were developed by school students. The Vikram rockets will be able to carry between 290 kg and 560 kg payloads into sun-synchronous polar orbits.
- In comparison, India’s workhorse PSLV can carry up to 1,750 kg to such an orbit.
- The newly-developed Small Satellite Launch Vehicle (SSLV), meant for carrying smaller commercial satellites, can carry up to 300 kg to sun-synchronous orbit.

➤ **More coming from private sector**

- Although Skyroot is the first private company to launch its rocket, others are not far behind.
- Agnikul Cosmos, whose semi-cryogenic Agnilet engine was test-fired for 15 seconds recently at ISRO's vertical testing facility at Thumba Equatorial Rocket Launching Station (TERLS).
- And ISRO's Small Satellite Launch Vehicles (SSLV) are also likely to be manufactured and operated by private players soon.
- Regarding the entry of private players in the space sector in India, around 100 start-ups have registered with the space agency ISRO.

ANSWER WRITING

Q. Given the diversities among tribal communities in India, in which specific contexts should they be considered as a single category?

- Government of India Act 1935 included members of the community living or dependent on the forest, in a single category called Scheduled Tribe (STs).
- The tribals in India have a very broad diversity ranging from matriarchal khasis of the Meghalaya and patriarchal tribes of the Rajasthan and Gujrat. They also differ on the basis of the origin like African origin Siddis of Gujarat and indigenous tribes of Andaman and Nicobar like sentinels.
- Apart from the constitutional and legal provisions to include STs in a single category, there are several socio-economic grounds which binds them in a single category. Like:
 - They are usually geographically isolated.
 - They follow similar religious practices like tattoo, amulets, and Jewlery and belief in magic.
 - Usually, they worship their common ancestors and nature worship is common among them.
 - They are mostly dependent on the forest for their livelihood and have unanimity with nature for a well-balanced environment.
 - Their social structure is less stratified compared to caste and have egalitarian structure.
 - They have an animistic belief system.
 - Most of them are territorial groups and dedicated to their own tribe and culture.
 - Most of them are practicing primitive occupations like shifting cultivation, etc.
 - They have most indigenous political organization i.e., the council of the elders like sabhas and samitis of the vedic period.
 - Their society is usually self-reliant and self-sufficient.
 - Most of them are different from mainstream society.
- Dr. Ambedkar had also advocated their distinct socio-religious and cultural practice and demanded to include them in a separate, single and distinct category.

MCQs

1. Consider the following statements Pangong Tso lake which was in news recently.

1. Pangong Tso is an endorheic lake.
2. Despite having salty water, the lake entirely freezes over throughout the winter.

Which of the above statements is/are correct?

- a) 1 only
- b) 2 only
- c) **Both 1 and 2**
- d) Neither 1 nor 2

2. With reference to the term "Moscow Format" has been in news recently, consider the following, it pertains to

1. The format pertains to Azerbaijan-Armenia issue.
2. The Moscow format was introduced in 2017 on the basis of the six-party framework for consultations between special representatives from Russia, China, Pakistan, Afghanistan, Iran, and India.

Choose the correct statement using the codes given below

- a) 1 only
- b) **2 only**
- c) Both 1 and 2
- d) Neither 1 nor 2

3. With reference to Vikram S rocket consider the following statements

1. The rocket has been developed by Hyderabad-based Skyroot Aerospace company.
2. The Vikram-S rocket is a single-stage sub-orbital launch vehicle.
3. The Vikram series of rockets are only use solid fuel that is powdered aluminium.

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

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

4. Consider the following with reference to Carbon Tax:

1. It is a form of carbon emission trading where there is a cap on greenhouse gas (GHG) emissions and the credits can be traded in the market.
2. Sweden was the first country to introduce carbon tax in the world.
3. Carbon tax ensures the emitters pay for the external cost they impose on society.

4. Carbon tax is applicable only to companies which emit more than 10 million tonnes of GHG per annum. Which of the above given statements is/are correct?
- 1 and 2 only
 - 2 and 3 only**
 - 1 and 3 only
 - 2 and 4 only
5. Consider the following statements about 'Carbon Credit':
- A carbon credit is a tradable permit.
 - The holder of the credit has the right to emit ten ton of carbon dioxide or an equivalent of another greenhouse gas.
 - The main goal for the creation of carbon credits is the reduction of emissions of carbon dioxide and other greenhouse gases.
- Which of the statements given above is/are correct?
- 1 and 2 only
 - 2 and 3 only
 - 1 and 3 only**
 - 1,2 and 3
6. With reference to polygraph and narcoanalysis tests consider the following
- The results of the tests cannot be considered to be "confessions", but any information or material subsequently discovered with the help of such a voluntarily-taken test can be admitted as evidence
 - The Home ministry adopted a set of guidelines relating to the administration of the Polygraph Test which included consent, recording of the test.
- Which of the above statement/s is /are incorrect?
- 1 only
 - 2 only**
 - Both 1 and 2
 - Neither 1 nor 2
7. Due to India-Norway relation, Hong Kong Convention recently seen in news, the Hong Kong Convention is related to
- Biological Weapons
 - Recycle of space debris
 - Recycle of Ships**
 - Water use
8. The Hunger Hotspots Outlook report is jointly published by which of the following?
- Food and Agriculture Organization (FAO)
 - World Food Programme (WFP)
 - UNICEF
 - United Nations Development Programme (UNDP)
- Choose the correct answer using the codes given below:
- 1 and 2 only**
 - 2 and 3 only
 - 3 and 4 only
 - 2 and 4 only
9. Recently Madhya Pradesh notifies PESA Rules on the occasion of Janjatiya Gaurav Divas, with reference PESA Act consider the following statements?
- It aims to provide 'Swaraj' for the tribal population.
 - The reservation for Scheduled tribes shall not be less than 2/3rd of the total number of seats.
 - Gram Sabha is empowered to approve plans/projects for socio-economic development before being implemented.
 - The recommendation of Gram Sabha is mandatory for grant of mining lease of minor minerals and to regulate sale of intoxicants.
- Which of the following statements is/are True?
- 1 only
 - 2 and 3 only
 - 1,3 and 4 only**
 - All of the above
10. Consider the following statements with reference to Prevention of Children from Sexual Offences (POCSO) Act
- The Act provides for relief and rehabilitation as soon as the complaint is made to the Special Juvenile Police Unit only.
 - The Act provides for the establishment of Special Courts for the trial of offences under the Act.
 - POCSO Act is a mandatory international commitment since India is a signatory to the UN convention on the Rights of the Child.
- Select the correct statement using the codes given below.
- 1 and 2 only
 - 2 and 3 only
 - 1 and 3 only
 - All of the above**