CLIMATE

- **How far back does Delhi's air pollution problem go? What policy measures have been taken over the decades by the Union and State governments? What are the major pollutants contributing to the increased PM2.5 levels in the capital? Have the measures taken by the State been effective?**
- **When did Delhi start acting against air pollution?**
- In March 1995, the Supreme Court, while hearing a plea by environmentalist and lawyer M.C. Mehta about Delhi's polluting industries, noted that Delhi was the world's fourth most polluted city in terms of concentration of suspended particulate matter (SPM) in the ambient atmosphere as per the World Health Organization's 1989 report.
- The Court took note of two polluting factors — vehicles and industries, and in 1996 ordered the closure and relocation of over 1,300 highly-polluting industries from Delhi's residential areas beyond the National Capital Region (NCR) in a phased manner.
- In 1996, Mr. Mehta fled another public interest litigation (PIL) alleging that vehicular emissions were leading to air pollution and that it posed a public health hazard. In the same year, a report about Delhi's air pollution by the Centre for Science and Environment made the apex court issue a notice to the Delhi government to submit an action plan to curb pollution.
- Both matters were later merged. Later that year, the Delhi government submitted an action plan. The Supreme Court, recognizing the need for technical assistance and advice in decision-making and implementation of its orders, asked the Ministry of Environment and Forests (now the Ministry of Environment, Forests, and Climate Change — MoEFCC) to establish an authority for Delhi, leading to the creation of the Environmental Pollution Control Authority of Delhi NCR (EPCA) in 1998.
- The EPCA submitted its report containing a two-year action plan in June of that year and the Supreme Court subsequently ordered the Delhi Transport Corporation (DTC) bus feet, taxis, and autos to switch to Compressed Natural Gas (CNG), and the phasing out of all pre-1990 autos.
- Other measures between the late 1990s and early 2000s included the complete removal of leaded petrol, removal of 15 and 17-year-old commercial vehicles and a cap of 55,000 on the number of two-stroke engine auto rickshaws (which reports at the time said were contributing to 80% of pollution in the city). Coal-based power plants within Delhi were also converted to gasbased ones.
- Around the same time, the Centre decided to establish a network of monitoring stations under the National Air Quality Program (NAMP) to measure key pollutants. Under the National Ambient Air Quality Standards (NAAQS) specifed by the Central Pollution Control Board (CPCB), pollutants like PM10 (particulate matter with a diameter exceeding 10 microns), sulphur dioxide and nitrogen oxides were measured.
- **How was air quality standards revised?**
- The NAAQS were revised in 2009 to include 12 categories of pollutants including PM2.5 (particulate matter with a diameter under 2.5 microns) — a noxious pollutant which can penetrate deep into the lungs and even enter the bloodstream, resulting in cardiovascular and respiratory impacts.
- Particulate Matter (PM) is primarily generated by fuel combustion from different sectors, including transport, energy, households, industry and agriculture.
- According to the revised NAAQS, the acceptable annual limit for PM2.5 is 40 micrograms per cubic metre (ug/m3) and 60 ug/m3 for PM10. The renewed WHO standards meanwhile, prescribe an accepted annual average of 5 ug/m3 for PM2.5 and 15 ug/m3 for PM10. While PM2.5 as a pollutant was only included in 2009, a computer modelling study by Urban Emissions. Info re-analyzed the pan-India PM2.5 concentration from 1998 to 2020 and found that Delhi was the most polluted of all States/UTs each year through all the 23 years. Delhi's annual PM2.5 levels increased by 40% from 80 g/ m3 to 111 g/m3.
- Another study by the U.S.- based Health Efects Institute released this year, studying data between 2010 and 2019, also found Delhi to be the most polluted city in the world in terms of PM2.5 levels. In the winter of 2016, Delhi witnessed one of its worst incidents of pollution-induced smog, with PM2.5 and PM10 levels reaching a whopping 999 ug/m3 in parts of Delhi on November 1.
- Subsequently, the Supreme Court in November 2016 told Delhi and NCR authorities to form a plan to deal with the air pollution, and the MoEFCC in early 2017 came out with the Graded Response Action Plan (GRAP), which involved coordination between multiple agencies in Delhi to activate pollution control measures corresponding to the increasing Air Quality Index (AQI) levels.
- **What led to high pollution in Delhi?**
- Multiple studies over the years, including the Delhi Pollution Control Committee's (DPCC) 2019 report by IIT Delhi and Madras experts, found that the rapid growth in Delhi's population, industrialisation and urbanisation, and increase in motorised private vehicle feet led to the high concentration of air pollutants such as particulate matter, nitrogen oxides, sulphur dioxide, carbon monoxide, and ozone.

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- Between 2001 and 2011, Delhi saw a population spurt from 1.378 crore to 1.678 crore. As of 2011, the population of Delhi and NCR was 25.8 million or 7.6% of India's urban population. While Delhi's total area is 1,483 square kilometres (sq km), the population density grew from 9,340 persons per sq km in 2001 to 11,320 persons per sq km in 2011. From around 4.2 million motor vehicles registered in 2004 in Delhi alone, the registered vehicles increased to around 10.9 million in March 2018.

- **What are the measures taken to tackle major polluters?**
- Urban Emissions Info combined officially available information and its modelling studies to infer that the share of vehicular exhaust contributing to Delhi's PM2.5 pollution is up to 30% while soil and road dust is up to 20%, biomass burning is 20%, industries is up to 15%, diesel generators up to 10%, power plants up to 5% and notably, the share of pollution from outside Delhi's urban air shed (like stubble burning in neighbouring States) is up to 30%.
- Multiple researchers have alleged that the policy approach and measures taken by the Central and State authorities for specific polluting sectors over the years have been fragmented and often reactive. IIT-Bombay professor Vinish Kathuria noted in the Economic and Political Weekly that the 2002 public transport overhaul to CNG did not yield the desired results. While SPM and PM10 levels fell marginally, carbon monoxide levels increased. Meanwhile, due to the Supreme Court's 55,000 cap on two-stroke auto rickshaws, the sector could not grow, leading to black marketing of permits. Studies note that between 1997 and 2011, Delhi's population grew by 45% and registered cars and twowheelers grew by 250%, meaning the lower availability of autos could have likely contributed to increased private vehicle ownership.
- Besides, Delhi still does not have the required public bus feet vis-a-vis demand. Researchers have also noted challenges with newer policies like the odd-even vehicular rationing rule applying only to private vehicles. A study by IIT Delhi's Rahul Goel noted that although vehicular emissions contribute 25% to Delhi's PM2.5 levels, passenger vehicles contribute just 8%, of which cars constitute 5%. This means that if all passenger vehicles within Delhi stopped operating, PM2.5 levels would reduce by an average of 8%, but the remaining 17%, contributed by heavy freight vehicles, would remain as it is not covered under the odd-even rule. Experts also point out that a coordinated response factoring in Delhi's waste management has to be taken to reduce air pollution.
- While the daily waste generation rate in Delhi is over 10,000 tons, the capacity of its already overflowing landfills to collect and manage garbage is under 6,000 tons. This leads to the practice of burning waste around residential areas. Reports show that garbage is also burnt illegally in landfills when curbs are in place. As for the burning of farm residue or stubble in Delhi's neighbouring States — Haryana, Punjab, Uttar Pradesh, and Rajasthan — researchers have emphasised the need for air shed management, along with improved machinery subsidies from the government and alternatives to crop burning.
- An air shed is a common geographic area where pollutants get trapped. One major argument for the failure to tackle Delhi's pollution problems is that a large proportion of these polluting sources are present all year round and high pollution levels are mainly witnessed in winter months due to unfavourable meteorological conditions, meaning stop-gap and seasonal measures often yield unsatisfactory outcomes.

SCIENCE AND TECHNOLOGY

- **<u>Context:</u> India's first private satellite vehicle set for launch: All you need to know about Vikram S, and why it is a big deal?**
- India's first privately developed launch vehicle is set to make its maiden flight from Indian Space Research Organisation's (ISRO) launchpad at Sriharikota between November 12 and 16. The mission, of Hyderabad-based Skyroot Aerospace, is called 'Prarambh' (the beginning), and will carry two Indian and one foreign customer payloads on the launch vehicle named 'Vikram'.
- Vikram's successful launch will mark a big step for India's space exploration sector. In fact, Skyroot on its website claims, "Launching satellites to space will soon become as easy as booking a cab — Quick, precise and affordable!"
- Prarambh will see Vikram-S carry three customer satellites in a sub-orbital flight. Sub-orbital flight, like the ones undertaken by Jeff Bezos and Richard Branson, travel slower than orbital velocity — they are fast enough to reach outer space but not fast enough to stay in orbit around the Earth.
- Also, Spacekidz, a Chennai-based aerospace startup, will fly 'Fun-Sat', a 2.5 kg payload developed by students from India, the US, Singapore and Indonesia, on Vikram-S.

<u>Vikram's features:</u>

- As reported by PTI, Skyroot was the first startup to sign a memorandum of understanding with ISRO for launching its rockets. Its launch vehicles have been crafted specially for the small satellite market, and are named 'Vikram' as a tribute to Vikram Sarabhai, founder of the Indian space programme. They come in three forms, Vikram I, II, and III.
- According to Skyroot, "More than 20,000 small satellites are estimated to be launched in the coming decade, and Vikram series is designed to enable this through unprecedented mass producibility and

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affordability. The leading technology architecture of Vikram vehicles offers unique capabilities like multi-orbit insertion, interplanetary missions; while providing customised, dedicated and ride share options covering a wide spectrum of small satellite customer needs."

- Skyroot claims a Vikam rocket can be assembled and launched within 24 hours from any launch site, and has the "lowest cost in the payload segment".
- As reported earlier by The Indian Express, for a very long time, small satellites — anything weighing between 5 and 1,000 kg — had to remain content with hitching a ride to space on rockets commissioned to carry some other, larger satellites.
- The timeline of the launch would be dictated by this larger, primary, satellite, whose interests would take precedence. But with more and more businesses, government agencies, even universities and laboratories beginning to send satellites — nearly all of them falling in this category of small satellites — to space, the constraints of a piggyback ride have started to hurt.
- The demand for the launch of small satellites has increased at a rapid pace in the last eight to ten years, thanks to the ever-growing need for space-based data, communication, surveillance, and commerce. The need for satellite data, imageries and space technology now cuts across sectors, from weather to agriculture to transport to urban development.
- In India, ISRO is capable of launching satellites into space, and the demand is fast outrunning its capacity, especially as the space agency also has other, larger goals it needs to focus on. Therefore, the sector is being opened up to private players, with ISRO helping them with facilities and knowledge. The use of facilities can be chargeable, providing ISRO with revenue.

PRELIMS

1. India and UNHRC

- **Context: Solicitor-General Tushar Mehta to lead Indian delegation to UNHRC**
- Solicitor-General Tushar Mehta will lead the official Indian delegation to the Human Rights Council where the Fourth Universal Periodic Review will take place on Thursday, the Ministry of External Affairs has announced.
- A press release stated that India has been "engaged constructively" with members of the UNHRC and others in the United Nations to support human rights across the world. The announcement came hours before the session where countries like the United States, U.K., Belgium, Germany and Spain are expected to raise issues like the Citizenship Amendment Act and incidents of "hate speech" and the hijab issue of Karnatak.

- **About UN Human Rights Council (UNHRC)**
- It is an **intergovernmental body** within the United Nations system.The UNHRC replaced the former UN Commission on Human Rights. It was created by the UNGA on March 15, 2006, and the body met in its first session in June, 2006.
- It is responsible for strengthening the **promotion and protection of human rights** around the world. It also addresses and **makes recommendations** on situations of human rights violations.
- **Membership of the Council:** The Council is made up of **47 UN Member States** who are elected by **majority vote** through a direct and secret ballot at the UNGA.
- The membership of the Council is based on **equitable geographical distribution**.
  - ✓ African and Asia-Pacific states have 13 seats each,
  - ✓ Latin American and Caribbean states have 8 seats,
  - ✓ Western European and other states have 7 seats, and
  - ✓ Eastern European states have 6 seats.
- The members serve for **three years** and are **not eligible for immediate re-election** after serving two consecutive terms.
- Almost two-thirds of UN Human Rights income comes from **voluntary contributions** from the Member States and other donors. The remainder is covered by the **UN regular budget**.

2. Pashmina shawls

- **Context:** Traders of universally prized Pashmina shawls are complaining that "obsolete testing methods" have resulted in many of their export consignments being fagged by Customs authorities for presence of Shahtoosh guard hair, which is obtained from endangered Tibetan antelopes.
- The traders claim the use of obsolete techniques such as "light microscopy" by the authorities has resulted in several cases of "false positives", leading to their wrongful prosecution. Pashmina is obtained from a breed of mountain goats (Capra hircus) found on the Changthang Plateau in Tibet and parts of Ladakh. Manufacture of Pashmina is a largely un organised cottage and handicraft industry, providing employment and livelihood to approximately six lakh people, most notably to local skilled villagers and artisans in Kashmir.
- India contributes only about 1% of the world's Pashmina, but the Pashmina produced in India is considered the best of the lot.

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- Shahtoosh, on the other hand, is the fine undercoat fibre obtained from the Tibetan antelope, known locally as chiru, a species living mainly in the northern parts of the Changthang Plateau in Tibet.
- As they offer high levels of smoothness and warmth, Shahtoosh shawls is a highly expensive commodity. However, when their population declined dramatically from commercial poaching, CITES (Convention on International Trade in Endangered Species of Wild Fauna & Flora) listed the Tibetan antelope in 1979, leading to a ban on sale and trade of Shahtoosh shawls and scarves.

3. <u>Chief Justice Of India</u>

- **Context: D.Y. Chandrachud takes charge as the 50th Chief Justice of India**
- Justice Dhananjaya Yashwant Chandrachud was sworn in as the 50th Chief Justice of India (CJI) by President Droupadi Murmu at a brief ceremony at the Rashtrapati Bhavan in New Delhi on Wednesday. He took the oath in English and in the name of God, in the presence of Vice-President and Rajya Sabha Chairperson Jagdeep Dhankhar, Lok Sabha Speaker Om Birla, Defence Minister Rajnath Singh, Home Minister Amit Shah, and Law Minister Kiren Rijiju.
- Justice Chandrachud as CJI will have a term of two years and will head India's judiciary until November 10, 2024, a day before he completes 65 years. His father, Y.V. Chandrachud, holds the distinction of being the longest-serving Chief Justice, who headed the judiciary from February 22, 1978 to July 11, 1985.
- He has been part of several Constitution Benches and landmark verdicts of the top court, including judgments on the Ayodhya land dispute, and the right to privacy. He wrote the lead judgment for a nine-judge Constitution Bench in the Justice K.S. Puttaswamy vs Union of India case, in which it was unanimously held that the right to privacy was a Fundamental Right. Recently, a Bench headed by him expanded the scope of the Medical Termination of Pregnancy Act to include unmarried women for abortion between 20 and 24 weeks of pregnancy.
- The new Chief Justice has been part of the Benches that delivered pathbreaking judgments on decriminalising same-sex relations, after it partially struck down Section 377 of the Indian Penal Code. He has been part of Benches that ruled on the validity of the Aadhaar scheme and the Sabarimala issue, and paved the way for permanent commission for women officers in the armed forces.
- He was designated as a senior advocate by the Bombay High Court in June 1998 and became Additional Solicitor-General that year till his appointment as a judge in the Bombay High Court on March 29, 2000. He went on to become the Chief Justice of the Allahabad High Court from October 31, 2013 until he was elevated to the top court in May 2016.

4. <u>Context</u>: Commerce Ministry says changes introduced for granting export benefits and incentives, as well as Fulfilment of Export Obligation norms for importers, for export realisations made in Indian rupees

- The government has expanded the norms for incentives and export obligations under the Foreign Trade policy to cover foreign trade transactions settled in rupees, the Commerce Ministry said on Wednesday.
- In July, the Reserve Bank of India (RBI) and the Directorate General of Foreign Trade (DGFT) had carried out amendments in the Foreign Trade Policy and trade settlement procedures to enable the use of the rupee for invoicing, payment and settlement of export, import dues.
- The ministry said that changes have now been introduced for granting export benefits and incentives as well as Fulfilment of Export Obligation norms for importers, for export realisations made in Indian rupees.
- "Given the rise in interest in internationalisation of Indian rupee, the policy amendments have been undertaken to facilitate and to bring ease in international trade transactions in Indian rupees," the ministry said in a statement.
- Engineering Export Promotion Council India chairman Arun Kumar Garodia said allowing trade settlements in the rupee under the various export promotion schemes should help boost exports and signals 'internationalisation of the domestic currency'. "These are early steps towards 100% convertibility of the Indian rupee," he noted.

ANSWER WRITTING

Q. What do you understand about the term 'metaverse'? Highlight its applications and challenges arising out of such applications.

The New Tech world is always full of jargons & buzzwords, one such buzzword is 'Metaverse'. A platform for augmented reality called Metaverse enables users to build interactive experiences that combine the virtual and real worlds. Additionally, it can be considered a virtual version of the concept or idea of cyberspace

There are a number of interesting use cases and applications for Metaverse:

- Banking & Finance: Banks and other financial institutions utilize Metaverse to improve customer service, cut expenses, and streamline processes. For example, KYC can be conducted through a metaverse platform.
- Healthcare: For example, the use of metaverse technologies can help in solving the problem of locating a vein.

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- Corporate Sector: Metaverse has the potential to unleash a revolution in the business communication and productivity space. For example, a full-blown hologram of a person will sit in front of you, interact, and communicate with you as a real person does.
- Marketing: Imagine virtual hoardings and billboards on virtual highways and expressways that are being seen by millions of users or avatars in real-time.
- Defense: Metaverse could empower countries to create a highly realistic virtual world that would better prepare defense personnel for challenging scenarios.
- Tourism: The pandemic undoubtedly resulted in losses and setbacks for the travel industry, but the potential of virtual travel could lead to the emergence of a brand-new tourist niche.
- Education: The metaverse is a media-rich setting that can serve as a hub for education. For example, students and teachers may connect in the digital world regardless of where they are in the physical world.
- Gaming: Games that use the metaverse provide players with a more realistic and immersive gaming experience.

Definitely, metaverse is promising but like any other technology, it comes with its own set of challenges:

- Technical Challenges:
  - Data Security: Sharing of data across boundaries for processing can pose a threat to national security as the metaverse can be used as a platform for recruitment by terrorist groups.
  - Cybersecurity: Design weaknesses in software need to be addressed and systems need to be properly tested. For example, by hacking VR headgear or glasses, hackers can steal personal information.
  - Interoperability: Interoperability remains one of the most important challenges. In the early days of the metaverse, we will probably have several metaverses with little to no interoperability.
- Regulatory Challenges:
  - Privacy: There are concerns about potential violation of privacy of meta users & mechanism to deal with same. For example, how the "right to be forgotten" covered under Article 21 would be upheld is a concern.
  - Intellectual Property Rights (IPR): A new challenge for Intellectual Property (IP) rights will arise with the metaverse. For example, NFTs can raise legal concerns over intellectual property ownership and rights.
  - Regulatory Structure: India is largely unequipped to deal with the issues arising from the use of metaverse technology in the absence of Data Protection Law.
- Others:
  - Electricity Usage: Issues of metaverse include high computation power leading to higher electricity usage.
  - Identity Issues: There will be challenges concerning identity authentication or verification when you're in it.

The possibilities offered by the metaverse can be limitless. With increasing technological influence and demographic advantage, India has the opportunity to make the most of the metaverse. However, the first logical step is to put the required regulatory structure in place.

MCQs

1. Consider the following statements;
   1. In judicial appointments, it is obligatory for the President to take into account the opinion of the CJI.
   2. The opinion of the CJI is binding on the Government.
   3. The opinion of the CJI must be formed after due consultation with a collegium of at least Two senior-most judges of the Supreme Court.

   Choose the correct option from the codes given below:

   a) Only 1 & 2 b) Only 2 & 3 c) Only 3 d) 1, 2 & 3
2. What is the size range of respirable suspended particulate matter?
   a) Less than 1 micrometre
   b) **Less than 10 micrometre**
   c) Less than 100 micrometre
   d) Less than 0.1 micrometre
3. Consider the following statements;
   1. The Human Rights Council is an inter-governmental body within the United Nations responsible for strengthening the promotion and protection of human rights worldwide.
   2. Currently, the United Nations Humans Rights Council has 47 members, and to ensure geographical representation of the entire world, seats are allocated on Bi-annual basis.

   Which among the above statements are incorrect?

   a) 1 only **b) 2 only** c) Both 1 & 2 d) None of the above

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4. Consider the following statements;
   1. The Foreign Trade Policy is a legal document, issued by the Government of India, enforceable under the Foreign Trade Development and Regulation Act 1992.
   2. The prime objective of a foreign trade policy is to facilitate trade by reducing transaction and transit costs and time.
   Which among the above statements are correct?
   a) 1 only b) 2 only **c) Both 1 & 2** d) None of the above
5. Consider the following statements regarding India's first privately developed rocket, Vikram-S:
   1. It was developed by the Hyderabad-based Skyroot Aerospace.
   2. The mission named 'Prarambh' (the beginning), since it is the first mission for Skyroot.
   3. The Vikram series, named after the founder of India's space programme Dr Vikram Sarabhai, are all-carbon-fibre structures that can launch up to 800 kg of payloads to the Low Earth Orbit.
   Choose the correct option from the codes given below:
   a) Only 1 & 2 b) Only 2 & 3 c) Only 3 **d) 1, 2 & 3**
6. Consider the following statements:
   1. The Directorate of Handicrafts and Handloom, Kashmir has announced a Minimum Support Price (MSP) for Geographical Indication (GI)-certified hand-made Pashmina shawls "to sustain the old techniques".
   2. Pashmina is known world over as cashmere wool, it comes from a special goat (Capra hircus) living at an altitude of 12000 to 14000 ft.
   3. It also comes from a rare antelope living at Tibetan a height of over 14000 ft in the wilds of the Himalayas.
   Choose the correct option from the codes given below:
   a) Only 1 & 2 b) Only 2 & 3 c) Only 3 **d) 1, 2 & 3**
7. Consider the following statements, with respect to Global Hunger Index (GHI)
   1. It is jointly published by Concern Worldwide and Welthungerlife
   2. A low score in the index reflects higher ranking of a country and implies a better performance.
   3. India's rank has significantly improved during the last five years in the GHI.
   4. India ranks 110th out of 121 countries in the Global Hunger Index 2022.
   Which of the statements given above is/are correct?
   a) 1 and 2 only
   b) 1, 2 and 4 only
   c) 1, 2 and 3 only
   d) 1 and 4 only
8. Recently Economically Weaker Section (EWS) Quota has been news. Consider the following statements:
   1. It has been brought into force by the 104th Constitutional Amendment Act.
   2. It violates the Basic Structure Doctrine as it is not in line with Indra Sawhney's Judgement.
   3. It has amended Articles 15 and 16 of the Indian Constitution.
   Which of the above statements is/are correct?
   a) 1 and 2 only
   b) 2 and 3 only
   c) 3 only
   d) 1 and 3 only
9. Consider the following statements regarding Shahtoosh fibre:
   1. It is obtained from Pashmina goats of Changthang plateau.
   2. Manufacture of Pashmina is a largely unorganised cottage/handicraft industry providing employment and livelihood to local skilled villagers and artisans in Kashmir.
   Which of the above statements is/are correct?
   a) 1 only **b) 2 only** c) Both 1 and 2 d) Neither 1 nor 2
10. Which of the following statements is/are correct about Central Pollution Control Board (CPCB)?
    1. It is statutory body under the Ministry of Environment and Forests (MoEF)
    2. CPCB's head Office is in Bhopal.
    Select the correct answer using the codes below
    a) 1 only b) 2 only c) Both 1 and 2 d) Neither 1 nor 2

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