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Ozone

As per Central Pollution Control Board's data ground level ozone has become a prominent pollutant in Delhi's air.

- Ozone is a *colourless gas*, an inorganic oxygen molecule with chemical formula O3.
- **Paramagnetic**- Ozone is weakly attracted to magnetic fields.
- **Ozone layer**-The ozone layer thickness varies geographically and also seasonally. It is thickest in spring and thinnest in autumn and it is thickest near the equator and thinnest near the poles.
- **Role**- It plays a critical role on Earth by shielding life from the sun's harmful *ultraviolet-B and ultraviolet-C* radiation. The depletion of the ozone layer was first noticed in the early 1980s in Antarctica.
- **World Ozone Day**- It is celebrated on *16th September* each year to commemorate the signing of the *Montreal Protocol*, an international environmental treaty for phasing out of production and consumption of Ozone Depleting Substances, that came into force on this day in 1987.
- **Types-**
  - Ground level ozone
  - Stratospheric ozone

Key aspects	Ground level ozone	Stratospheric ozone
About	It is an air pollutant near the earth's surface formed by chemical reactions between pollutants in the presence of sunlight.	It is known as the "ozone layer", located high in the Earth's stratosphere.
Location	Found in the *lowest layer* of the atmosphere called the troposphere, which extends from the Earth's surface up to 10km in altitude.	It is located in *stratosphere* which is above the troposphere and extends from about 10 km to 50km above the Earth's surface.
Formation	It forms as a result of complex chemical reactions involving precursor pollutants, specifically volatile organic compounds (VOCs) and nitrogen oxides (NOx) in the presence of sunlight at ground level.	Primarily forms through natural processes, where oxygen molecules (O2) are exposed to high-energy ultraviolet (UV) radiation from the Sun,
Role	It is considered a *harmful air pollutant* contributes to the formation of smog and can have harmful effects on human health and the environment.	It serves as a *protective role* as it absorbs and blocks a significant portion of the sun's harmful UV radiation.

Adverse impact of ground level ozone

- **Impact on health-** Exposure to ground-level ozone can lead to coughing, throat irritation, and shortness of breath.
- **Vulnerability**- Those with respiratory conditions, asthma, chronic obstructive pulmonary disease (COPD), and particularly children with premature lungs and older adults are at serious risk.



- **Smog-** It is a component of smog, it reduces visibility and degrades ait quality.
- **Environmental impact-** It can harm plan tissues leading to reduced crop yields and forest productivity. It disrupts nutrient cycling alters plant communities and impact wildlife habitats.
- **Global warming-** It is a greenhouse gas hence it contributes to global warming making it a concern for climate change.

Reference

1. Times of India- Ozone a prominent pollutant in Delhi
2. PIB- World ozone day

Key terms in India-Mauritius Treaty Amendments

Recently India and Mauritius sign protocol to amend tax treaty

Key terms	About
Base Erosion and Profit Shifting	• It refers to *tax planning strategies* used by multinational enterprises that exploit gaps and mismatches in tax rules to avoid paying tax. • Organisation for Economic Co-operation and Development (OECD) actively working to combat BEPS. • OECD/G20 Inclusive Framework on BEPS is implementing 15 actions to tackle tax avoidance, improve the coherence of international tax rules, ensure a more transparent tax environment, and address the tax challenges arising from the digitalisation of the economy.
Treasury shopping	• It typically involves the attempt by a person to indirectly access the benefits of a tax treaty between two jurisdictions without being a resident of one of those jurisdictions. • It is a means of *tax avoidance* that involves the use of tax driven structures to take advantages of favourable double taxation agreements. • It undermines *tax sovereignty* by claiming treaty benefits in situations where these benefits were not intended to be granted, thereby depriving jurisdictions of tax revenues.

Double Taxation Avoidance Agreement (DTAA)	• It is essentially a bilateral agreement entered into between two countries with the basic objective to promote and foster *economic trade and investment* between two countries by avoiding double taxation. • Double taxation relief is one of the goals of DTAA, which aims to promote the nation as an appealing investment destination. • Anti-abusive clauses are included in DTAAs to make sure that only legitimate citizens of the two countries benefit from them.
Principle Purpose Test (PPT)	• It was introduced as a part of BEPS project, which aims to prevent treaty abuse and treaty shopping by ensuring that tax treaty benefits are granted only in appropriate circumstances. • It is designed to deny tax treaty benefits if it can be determined that obtaining these benefits was one of the principal purposes of any arrangement or transaction. • This test is intended to counteract aggressive tax planning strategies that exploit the provisions of tax treaties.
General Anti Avoidance Rules (GAAR)	• It is an anti-tax avoidance law under Income Tax Act, 1961 framed by the Department of Revenue under the Ministry of Finance. • The regulation allows tax officials to deny tax benefits, if a deal is found without any commercial purpose other than tax avoidance. • It allows tax officials to target *participatory notes and deny double taxation benefits* if it were found to avoid taxes.
OECD's multilateral instrument	• It is a multilateral convention to implement tax treaty related measures to prevent BEPS. • It offers concrete solutions for governments to close loopholes in international tax treaties by transposing results from the BEPS Project into bilateral tax treaties worldwide. • It allows governments to implement agreed minimum standards to counter treaty abuse and to improve dispute resolution mechanisms while providing flexibility to accommodate specific tax treaty policies.

Reference

1. Indian Express- India-Mauritius treaty amendments
2. OECD- What is BEPS?

Great Nicobar Project

Experts have written to the National Commission of Scheduled Tribes (NCST) highlighting how the Great Nicobar Project will be harmful for the region's indigenous population.

- **Pilot project**- Niti Aayog, a government think tank.
- **Implementation-** By the Port Blair-based Andaman and Nicobar Islands Integrated Development Corporation (ANIIDCO)
- **Goal**- To leverage the locational advantage of the island for economic and strategic

reasons.

- **Greenfield coastal city-**
  - An International Container Transshipment Port (ICTP),
  - A greenfield international airport and a power plant
  - A township for the personnel who will implement the project.
- **ICTP-** It is located in Galathea Bay that enables India to use its geographical access to major shipping routes between East Asia and South Asia and major trading centres like Colombo, Port Klang and Singapore.

The port would help India to achieve significant milestones as envisaged under Maritime India vision 2030 and Amrit kaal Vision 2047

- **Great Nicobar Island-** It is situated at the foot of Andaman and Nicobar Islands and extends from Ranganatha Bay on the east coast to southwards to Galathea Bay and around the corner of Indira Point to Pemayya Bay.
- **National park-** It contains two national park namely Campbell Bay National Park and Galathea National Park.
- **Indigenous tribes-**
  - **Shompen**- They are hunter-gatherers who depend on forest and marine resources for sustenance.
  - **Nicobarese**- They lived along the west coast of the island were mostly relocated after the 2004 tsunami.
- **Significance**- The Great Nicobar Island was declared as biosphere reserve in 1989 and included in UNESCO's Man and Biosphere Programme in 2013.

Quick facts

Galathea Bay
• It is located on Great Nicobar Island in the Andaman and Nicobar Islands. • Galathea Bay is also the name of a National Park that was established in 1992. • It is part of the *Great Nicobar Biosphere Reserve*. • **Vegetation-** Galathea National Park consists largely of tropical and subtropical moist broadleaf forests. • **Fauna**- Notable animal species found in the park include the giant robber crab, megapode and Nicobar pigeon. • **Climate**- Acute tropical climate here, only with the summer season and monsoons, the inhabitants of the park here have never encountered winter conditions. • It is the prime nesting site of giant leatherback turtle, the largest turtle in the world.

References

1. Down To Earth- Great Nicobar project violate Constitutional mandate
2. PIB- Galathea Bay

Vector Borne Diseases

Scientists have identified a novel defence mechanism the human body uses to prevent zika and dengue infections.

- **Virus transmission-** The mere presence of a virus in a bodily fluid doesn't mean it is transmitted via that route.
- The Zika, dengue, and chikungunya viruses are present in fluids like saliva and semen but don't spread orally or sexually.
- **Tropism**-Once inside the new host, a virus must be present at the correct location to infect new target cells. Viruses are usually highly selective in the cells they infect.
- It occurs because most viruses have special proteins on their outer surface that make contact with a receptor on the host cell.
- **Apoptotic mimicry-** It is a strategy employed by certain viruses to evade the immune system and facilitate infection, it is done by expressing proteins such as PS receptor on virus surface.

  Phosphatidyl serine (PS) protein is usually expressed by dying cells in the body, as a signal to the immune cells to destroy them.

- However, instead of being destroyed, the viruses use this opportunity to enter and infect the immune cell themselves.

Viral disease	About	Prevention
Zika virus	It is a vector-borne flavivirus primarily caused by the bite of Aedes mosquitoes, mainly Aedes aegypti and Aedes Albopictus.	• There is no specific treatment available but symptoms can be treated with antipyretics and/or analgesics. • Vector control by using larvicides and protection against mosquito bite is a key measure to prevent it.
Dengue	It is the world's fastest-growing vector borne disease transmitted by Aedes aegypti mosquito.	• No specific treatment but early detection and access to proper medical care greatly lower fatality rates of severe dengue. • Dengvaxia and Qdenga are the vaccines available to treat dengue.
Chikungunya	It is a *ribonucleic acid (RNA) virus* that belongs to the alphavirus genus of the family Togaviridae transmitted by the bites of infected female 'Aedes aegypti and Aedes albopictus mosquitoes'.	• As of now, there is no cure, only symptomatic relief, with analgesics to help with the pain, antipyretics for the fever, rest, and adequate fluids. • Vaccine has been developed by European vaccine manufacturer and to be branded as Ixchiq.

References

1. The Hindu- Host defence against virus infections

2. WHO- Zika virus

Mount Erebus

Recently Mount Erebus is raining gold dust on earth 80 grams a day worth 6000 dollars.

- **Location-** Ross Dependency on Ross Island in Antarctica, it is the southernmost active volcano on Earth.
- **Discovery-** It was discovered by British explorer Captain James Ross in 1841, who named it after the ship HMS Erebus, which means “darkness” in Greek.
- **Stratovolcano**- It is classified as a polygenetic stratovolcano, its structure consists of a shield in the bottom half and a stratocone in the top half.
- **Climate-** Mount Erebus experiences extreme temperatures, with summit averages ranging from -20°C (summer) to -50°C (winter). Despite its icy slopes, steam usually rises from the summit, betraying the intense heat within.
- **Boiling lava lake**- It is located in its summit crater, which has been continuously active since 1972 and emits gas plumes and lava bombs.

- **Ice fumaroles**- The mountain is notable for its ice towers that form around gases that escape from vents in the surface.
- **Significance-** It is the second highest volcano in Antarctica after Mount Sidley, the highest active volcano in Antarctica.

  It is the 6th highest point of an island and second prominent mountain in Antarctica after Mount Vinson.

- **Golden volcano**- Scientists have estimated that around 80 grams of gold is being released daily worth 6000 dollars.

Quick facts

Volcanoes in news	Location
Mount Merapi, Mount Ruang	Indonesia
Mount Villarrica	Chile
Mount Litli Hrutur, Sundhnukagigar crater	Iceland
Mount Klyuchevskoy	Russia
Great Sitkin volcano	Alaska
Hunga volcano	Tonga

Reference

Hindustan Times- Mount Erebus is raining gold dust on earth



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