



PRELIMS MISSION TEST-20 (27-04-2024)

EXPLANATION

1. Consider the following statements

1. They are recognised as Reserved forests under Indian Forests Act: 1927
2. They are located at Southern edge of salt flats of Rann of Kutch in Gujarat
3. They are natural habitat for Cheetahs before they became extinct in India
4. Prosopis Juliflora species covers nearly 30 per cent of the grassland

The above description represents which of the following ecosystem?

- (a) Bugyal grasslands
- (b) Savanna grasslands
- (c) Banni grassland
- (d) Mark grasslands

Answer: c (Banni grassland)

Statement 1 is correct: Banni Grassland forms a belt of arid grassland ecosystem on the outer southern edge of the desert of the marshy salt flats of Rann of Kutch in Kutch District. It accounts for almost 45 per cent of the pastures in Gujarat. It was declared a Reserved Forest in 1955, under the Indian Forest Act, 1927

Statement 2 is correct: The Banni Grassland Reserve, (also known as Banni Grasslands) is a region consisting of an arid grassland system. They are located near the southern edge of the salt flats of Rann of Kutch in Gujarat, India.

Statement 3 is correct: Besides having 40 species of grass and 99 species of flowering plants, Banni is also home to the Indian wolf, jackal, Indian fox, desert fox, desert cat, caracal, hyena, chinkara, Nilgai, wild boar, Indian hare, common monitor lizard³ and the cheetah before it became extinct. Banni also has 273 bird species and in years of good rainfall, is home to thousands of migratory birds. Recently too, the Wildlife Institute of India (WII) classified Banni Grasslands as the last remaining habitat of the Cheetah in India.

Statement 4 is correct: Prosopis Juliflora is a non-native and invasive tree species that encroached on these grasslands. The Land Use Land Cover (LULC) assessment of the grassland over a 10 years interval revealed that grassland areas over the period gradually reduced while in the same period Prosopis Juliflora dominant area increased to say encroached

to more than 30 per cent. Therefore, within a gap of 20 years, the Prosopis Juliflora dominant areas doubled in Banni and it is also found that it depletes groundwater availability, increases soil salinity and makes the grassland more susceptible to wildfires.

2. Consider the following statements about Biological Oxygen Demand (BOD)

1. BOD is a standard criteria to determine the oxygen levels in an aquatic ecosystem
2. Temperature and pH value of water determine the BOD value
3. It is the most accurate method to measure the quality of water
4. BOD is used in medical and Pharma industries to test the oxygen consumption of cell culture

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: The quality of oxygen used up by microorganisms at 27°C and in darkness for 3 days in breaking down organic wastes in a water body is called its biological oxygen demand (BOD). Its value is a standard criterion for managing water pollution by computing oxygen levels in a water body. An evaluation is made by determining oxygen concentration in water before and after incubation at 20°C in dark for 5 days

Statement 2 is correct: The B.O.D value of an aquatic system depends upon the following

- The type and amount of organic waste
- The organisms action upon it
- Temperature and pH value of water

Statement 3 is incorrect: The chemical oxygen demand (COD) is an indicative measure of the amount of oxygen that can be consumed by reactions in a measured solution. It is the most accurate method to measure water and wastewater quality because it shows more accuracy than BOD (with a 5-10% relative standard deviation) and it offers a relatively short analysis time (2-hour digestion time), compared to the 5-day BOD test. The COD test is also often used to monitor water treatment plant efficiency.



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Statement 4 is correct: It determines the amount of organic matter present in soils, sewages, sediment, garbage, sludge, etc. The biochemical oxygen demand also determines the rate of respiration in living beings. BOD is also used in the medicinal & pharmaceutical industries to test the oxygen consumption of cell cultures.

3. Consider the following statements about Sea Grasses

1. Seagrass meadows can be found all around the world including the polar regions
2. Lakshadweep islands harbour the maximum number of species in India
3. They are known as ecosystem engineers
4. They are responsible for 12% of the organic carbon buried in the ocean, thus help in reducing greenhouse gasses

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Seagrasses are marine flowering plants capable of completing their life cycle when they are submerged in seawater. The seagrass ecosystem is one of the most widespread coastal vegetation types when compared to coral and mangrove ecosystems. They occur in all the coastal areas of the world except the polar regions because of ice scouring.

Statement 2 is incorrect: The seagrass flora occurs all along the coastal areas of India and it is represented widely, out of which the Gulf of Mannar and Palk Bay harbour the maximum number of species, followed by Andaman and Nicobar and Lakshadweep islands.

Statement 3 is correct: Seagrasses help maintain water quality, trap fine sediments and suspended particles in the water column and increase water clarity. If Seagrasses are absent, the sediments are stirred by wind and waves, decreasing water quality. This reduced water clarity affects marine animal behavior, decreasing the recreational quality of coastal zones. They filter nutrients from land-based

industries before reaching sensitive habitats like coral reefs. Seagrasses are known for providing many ecosystem services hence considered as “Ecosystem Engineers”

Statement 4 is correct: One square meter of seagrass can produce up to 10 liters of oxygen per day. In Australia, the primary productivity of seagrass meadows is higher than a mangrove forest, terrestrial forest, or grassland. Seagrass occupies only 0.1 % of the seafloor yet is responsible for 12 % of the organic carbon buried in the ocean, which helps reduce greenhouse gases.

4. Consider the following statements about Ecological footprint

1. It measures the amount of biologically productive area of the earth needed to produce the required resources as well as to absorb the wastes produced from such resources use
2. Ecological deficit is a condition when a country's bio-capacity is greater than its population's Ecological footprint
3. If the entire planet is running an ecological deficit, it is termed as “overshoot.”
4. Global Footprint Network was an initiative launched during the 2012 G20 Summit to maintain the Ecological footprint

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Ecological footprint is a concept that denotes the per capita ecological damage/environment impact. It is a resource accounting tool that helps countries understand their ecological balance sheet and gives them the data necessary to manage their resources and secure their future. By measuring the footprint of a population, an individual, city, or a nation we can assess the pressures on our planet. This can help us to understand how we can manage our ecological assets more wisely. It is expressed in global hectares (gha), or by number of planets, and it allows us to estimate



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the land surface needed by each individual to provide for their needs.

Statement 2 is incorrect: An ecological deficit occurs when the Footprint of a population exceeds the bio capacity of the area available to that population.

Statement 3 is correct: Ecological overshoot is the phenomenon which occurs when the demands made on a natural ecosystem exceed its regenerative capacity. Currently it takes 1.5 years for the Earth to regenerate the renewable resources that people use, and absorb the CO₂ waste they produce, in that same year.

Statement 4 is incorrect: Global Footprint Network, an international nonprofit organization founded in 2003, envisions a future where all can thrive within the means of our one planet. The mission of this NGO is to help end ecological overshoot by making ecological limits central to decision-making.

5. Consider the following species found in India

1. Lantana
2. Water hyacinth
3. Gulmohar
4. Argemone
5. Carrot grass
6. Cynodon

How many of the above are invasive alien species?

- (a) All the above except one
- (b) All the above except two
- (c) All the above except three
- (d) All the above except four

Answer: a (All the above except one)

Explanation: Invasive or alien species are non-native species which when introduced into new ecosystem cause biological invasions. As they are non native, these species have few or no natural predators to keep their populations in check. These species can also alter fire cycles, nutrient cycling and the hydrology and energy budgets in native ecosystems. There are many invasive alien species which are introduced by humans intentionally or otherwise through human agency or accidentally from one region to another. The following are some of invasive alien species found in India

- Carrot grass
- Mexican poppy

- Lantana camara
- Mimosa pigra
- Cat claw mimosa
- Opuntia
- Water hyacinth
- Gulmohar

Note: Cynodon is a genus of plants in the grass family, and It is native to warm temperate to tropical regions and is also known as Bermuda grass.

6. Consider the following statements about Dugongs

1. They are the largest herbivorous marine mammals in the world
2. In India, they are largely restricted to Eastern coast of Indian Ocean
3. They are listed as critically endangered in the IUCN list
4. India's first Dugong conservation reserve was located at Palk bay in Tamil Nadu

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: The Dugong (Dugong dugon), are the largest herbivorous marine mammal in the world, grazing primarily on seagrass. They can grow up to three meters long, weigh about 300 kilograms, and live for about 65 to 70 years.

Statement 2 is incorrect: In India, they can be found in the Andaman and Nicobar Islands, the Gulf of Mannar, Palk Bay, and the Gulf of Kutch. The dugong population, which was once numerous in Indian seas, now decreased to about 200 individuals and is thought to be steadily diminishing in both quantity and range.

Statement 3 is incorrect: The Dugong is listed as Vulnerable on the IUCN Red List of Threatened Species not as endangered. Its range spans 48 countries within the tropical and subtropical coastal and Island waters between east Africa and Vanuatu in Oceania.

Statement 4 is correct: The First Dugong Conservation Reserve is located in Palk Bay off the southeast coast of Tamil Nadu. This area is a semi



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enclosed shallow water body with an area of around 550 sq. km and a maximum depth of around 20 m.

7. Consider the following statements about Biomagnification

1. Biomagnification refers to accumulation of toxic chemicals in the tissues of organism
2. Agriculture is the largest source behind Biomagnification
3. Residue of pesticides in the milk of lactating mothers is the result of Biomagnification

Which of the statements given above are correct?

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

Answer: c (2 and 3 only)

Statement 1 is incorrect: Biomagnification refers to the increased concentration of a toxic chemical as one moves higher in the food chain, while Bioaccumulation refers to the accumulation of a toxic chemical in the tissue of a particular organism.

Statement 2 is correct: The agricultural pesticides, insecticides, fertilizers and fungicides are very toxic and are released into the soil, rivers, lakes, and seas. These substances contain small amounts of heavy metals such as mercury, arsenic, copper, lead and cadmium. Thus agriculture became the largest source for Biomagnification

Statement 3 is correct: Pesticide usage affects human health, biological interactions with non-target species, pesticide resistance, and alterations to and/or accumulation of pesticides in the environment. Different toxic chemicals can be transferred from the body stores and/or from the blood into the breast milk of a nursing mother. Recent studies were conducted on pesticide residues in breastmilk of women (lactating mothers) and from whom dichlorodiphenyltrichloroethane (DDT) and dichlorodiphenyldichloroethylene (DDE) was detected.

8. Consider the following statements about Conservation reserves

1. Prior concurrence of the central govt is required to declare an area as conservation reserve
2. Conservation reserve management committees has the power to regulate its own procedure
3. Private land can be included under community reserves
4. In India, more than half of the States/UT have at least one Conservation Reserve.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Section 36A of Wildlife Protection (Amendment) Act: 2002 provided for the declaration of an area as conservation reserve

36A. (1) The State Government may, after having consultations with the local communities, declare any area owned by the Government, particularly the areas adjacent to National Parks and sanctuaries and those areas which link one protected area with another, as a conservation reserve for protecting landscapes, seascapes, flora and fauna and their habitat: Provided that where the conservation reserve includes any land owned by the Central Government, its prior concurrence shall be obtained before making such declaration. But it is not mandatory to have central government concurrence in all cases.

Statement 2 is correct: Section 36B provided for Conservation Reserve Management Committee

36B. (1) The State Government shall constitute a conservation reserve management committee to advise the Chief Wild Life Warden to conserve, manage and maintain the conservation reserve. (2) The committee shall consist of a representative of the forest or Wild Life Department, who shall be the Member-Secretary of the Committee, one representative of each Village Panchayat in whose jurisdiction the reserve is located, three representatives of non-governmental organisations working in the field of wild life conservation and one representative each from the Department of Agriculture and Animal Husbandry. (3) The



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Committee shall regulate its own procedure including the quorum

Statement 3 is correct: 36C: Declaration and management of community reserve

36C. (1) The State Government may, where the community or an individual has volunteered to conserve wild life and its habitat, declare any private or community land not comprised within a National Park, sanctuary or a conservation reserve, as a community reserve, for protecting fauna, flora and traditional or cultural conservation values and practices.

Statement 4 is incorrect: Only 13 states in India have established conservation reserves in India.

9. Consider the following pairs about major air pollutants and health impacts associated with them

Pollutant	Health impact
Carbon Monoxide	Limits the assimilation of oxygen in human body
Mercury	Gingivitis
Lead	Damage to Kidneys
Nitrogen Oxides	Inflammation of lungs

How many pairs given above are correct?

- (a) One pair only
- (b) Two pairs only
- (c) Three pairs only
- (d) Four pairs only

Answer: d (Four pairs only)

Pair 1 is correctly matched: The Carbon monoxide gas is produced from sources such as Automobile exhaust, burning of wood and coal etc. This CO gas can disrupt the transport of oxygen by the blood (by binding to the hemoglobin in the blood, reducing the ability of blood to carry oxygen), leading to heart and health problems.

Pair 2 is correctly matched: Gingivitis is a common and mild form of gum disease (periodontal disease) that causes irritation, redness, and swelling (inflammation) of your gingiva, the part of your gum around the base of your teeth. The effect of Mercury on the human body such as nervous disorders, insomnia, memory loss, excitability, irritation, tremor, gingivitis, and Minamata disease.

Pair 3 is correctly matched: Lead is naturally occurring toxic metal found in the Earth crust. Its

widespread use has resulted in extensive environmental contamination. Lead causes long-term harm in adults, including increased risk of high blood pressure, impaired intelligence, and kidney damage. Exposure of pregnant women to high levels of lead can cause miscarriage, stillbirth, premature birth, and low birth weight.

Pair 4 is correctly matched: Nitrogen dioxide is not usually released directly into the air. Nitrogen oxide (NO) and other nitrogen oxides (NOx) react with other chemicals in the air to form nitrogen dioxide. The main source of nitrogen dioxide resulting from the combustion of fossil fuels (coal, gas, and oil). Elevated levels of nitrogen dioxide can cause damage to the human respiratory tract, respiratory infections, inflammation of the lungs, and asthma. Long-term exposure to high levels of nitrogen dioxide can cause chronic lung disease.

10. Consider the following statements about Black Carbon

- 1. It is long-lived climate pollutant with a life time of 10 years
- 2. It is a key component of fine PM 10 air pollution
- 3. Transport account for the most the of global black carbon emissions
- 4. In India, the Indo-Gangetic plain has a high burden of black carbon

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Statement 1 is incorrect: It is a short-lived climate pollutant with a lifetime of only days to weeks after release in the atmosphere. During this short period, black carbon can have significant direct and indirect impacts on the climate, the cryosphere (snow and ice), agriculture, and human health.

Statement 2 is incorrect: Black carbon is the black material emitted from gas and diesel engines, coal-fired power plants, and other sources that burn fossil fuels. They may vary in size and can be much smaller



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than PM_{2.5}. It is a major contributor to the fine particle (PM_{2.5}) burden in the air and not (PM₁₀).

Statement 3 is incorrect: Household energy production contributes the major source of black carbon with 51%, but the transport category accounts for only about 21% of black carbon emissions by being the second major contributor.

Statement 4 is correct: Black carbon results from the incomplete burning of fossil fuels. It is relatively short lived pollutant in the atmosphere but influences cloud formation and atmospheric heat absorption processes. The Indo-Gangetic plain is spread over North India in Haryana, Delhi, U.P., Bihar, partly Jharkhand, and West Bengal. These cities are mostly having a large dense population. Because of the large amount of fossil fuel usage, this region has a high burden of Black carbon (BC) with serious implications for regional climate and human health.

11. Consider the following statements

1. Less seasonal variations
2. Diversity of living soil microorganism
3. Higher sun's angle of incidence
4. Species having longer time to evolve

How many of the above statements are reasons for higher species diversity in tropics than temperate regions?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: Tropical environments are less seasonal, relatively more constant, and predictable. Such constant environments promote niche specialization and lead to greater species diversity.

Statement 2 is correct: The diversity of organisms living within soils is critical to all earth ecosystems because soil organisms are essential for the cycling of ecosystem nutrients, improving the entry of water into soil and its storage in the soil.

Statement 3 is correct: As there is more sunlight in the tropics the climate is combined with rainfall and soil nutrients, which led to more plant growth and

better adaptation. This had contributed to higher productivity, which led to greater diversity of species

Statement 4 is correct: The diversity of plants and animals is not uniform throughout the world. Rather, a distribution with species diversity decreases as we move away from the equator towards the poles due to Latitudinal gradients. Over the course of evolution, the tropical regions had gone only very few changes compared to temperate regions whose evolution has been interrupted by big freezes and other natural calamities. As, tropical latitudes have remained relatively undisturbed for millions of years they had a long evolutionary time which led to the high species diversification.

12. Consider the following statements

1. Speciation is the formation of new distinct species during the process of evolution.
2. Adaptation is the coordinated phenotypic response developed by an animal to a specific genotype only
3. Facultative mutualists are ones whose populations completely depend on each other for survival
4. Defensive mutualism where one species provide nutrients whereas others provide protection to other species

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Speciation is the creation of new, unique species as a result of evolution. A single evolutionary lineage can split into two or more lineages as a result of genetic changes brought on by natural selection, gene flow, mutations, and genetic drift. When a group within a species separates from other members of its species and develops its own distinct features.

Statement 2 is incorrect: Adaptation is the evolutionary response resulting from genetic changes in populations that compensate for the decline in performance caused by stress. Acclimation is the temporary adaptations developed by the animal to a



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specific stress (e.g., temperature, humidity, and photoperiod) in the changing environment while acclimatization refers to the adaptation developed by the animals to several individual stressors simultaneously.

Statement 3 is incorrect: Facultative mutualism is the interaction between two or more species where the species benefit from the interaction but can also exist independently of each other.

Statement 4 is correct: Defensive mutualism is a type of service-resource relationship where one of the species provides nutrients whereas the other provides protection against predators or parasites.

13. "Sea Snout" recently seen in news is associated with?

- (a) Algal boom occurred on the sea surface
- (b) Occurrence of mass scale death of sea animals
- (c) Spread of petroleum and oil on the sea surface
- (d) One of the types of sea sport famous in the oceanic region

Answer: a (Algal boom occurred on the sea surface)

Explanation: Sea snout is a thick, foamy layer of marine mucilage or a slimy layer of grey or green sludge in the sea formed from algal present in the water. It was very prevalent in Turkey's sea of Marmara. This layer covering the surface of the sea and has spread to 80-100 feet below the surface, posing a threat to marine ecosystems.

14. Consider the following statements about species diversity

- 1. Alpha diversity is the diversity of habitats in the total landscape or geographical area.
- 2. Beta diversity is represented by the species diversity between any two patches and their communities.
- 3. Gamma diversity is a within community diversity that represents number of species in a given habitat.

Which of the statements given above are incorrect?

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

Answer: b (1 and 3 only)

Statement 1 is incorrect: Alpha diversity is the species diversity present within each forest or grassland patch of the slope. It refers to the diversity within a particular area or ecosystem, and is usually expressed by the number of species in that ecosystem.

Statement 2 is correct: Beta diversity compares the species variety between two distinct entities that are frequently divided by an obvious geographic barrier, such as a river or a mountain crest

Statement 3 is incorrect: Gamma diversity is defined as the habitats over the total landscape for the geographical area. It could range over areas like the entire slope of a mountain, or the entire littoral zone of a sea shore. It is a measure of the overall diversity for the different ecosystems within a region.

15. Consider the following pairs about Wetland and the state they belongs to

Wetland	State
Rudra Sagar wetland	Rajasthan
Wembunur wetland	Tamil Nadu
Asan conservation reserve	Uttar Pradesh
Pala wetland	Mizoram

How many pairs given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Pair 1 is incorrectly matched: Rudrasagar Lake, also known as Twijilikma, is a lake located in Melaghar, in the state of Tripura. The Indian Government has identified Rudrasagar as one of the wetlands of National Importance for conservation and sustainable use based on its bio-diversity and socio-economic importance.

Pair 2 is correctly matched: Vembannur Wetland Complex is a man-made inland tank that forms the southernmost tip of peninsular India in the state of Tamilnadu. This wetland forms part of the Important Bird and Biodiversity Area and hence part of the BirdLife International Data Zone. About 250 species of birds have been recorded in the district.

Pair 3 is incorrect matched: The Asan Conservation Reserve is a 444-hectare stretch of the Asan River



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running down to its confluence with the Yamuna River in the Dehradun district of Uttarakhand. The damming of the River by the Asan Barrage in 1967 resulted in siltation above the dam wall, which helped to create some of the site's bird friendly habitats.

Pair 4 is correctly matched: Pala Wetland is the largest natural wetland in the state of Mizoram. The Site includes a relatively deep lake (over 16 meters deep on average) and its surrounding forest catchment area which climbs to almost 600m above sea level. The wetland supports a rich diversity of animal species, including at least seven mammals, 222 birds, 11 amphibians, and 21 reptiles

16. Consider the following statements about Silt pollution

1. Depletion of the size of the water body
2. Poor water quality
3. Road accidents
4. Algal blooms
5. Decrease in dissolved oxygen
6. Death of aquatic plants and animals

How many states given above are results of silt pollution?

- (a) All the above
- (b) All the above except one
- (c) All the above except two
- (d) All the above except three

Answer: a (All the above)

Explanation: Silt is the mud or soil that gets washed into water bodies as it gets loosened (soil erosion). Siltation is a common natural phenomenon in most water bodies, including soil, sand and mineral particles. Siltation of rivers and lakes reduces their water retention capacity and lead to flooding. When large portions of lakes are filled with Silt and sand deposit, it depletes the size of the water body.

- Silt can also change the landscape of where it deposits. Silt deposits can harm the ecosystem where there are fewer or no trees
- Fertilizers, chemicals and industrial waste that run off along with Silt becomes toxic. Toxic Silt is harmful to the river, lake and pond ecosystem. It affects plants, vegetation, and aquatic life by contaminating the water. It

often creates an acidic condition, reducing the quality of water

- These Fertilizers and chemicals which get deposited in the water bodies promotes the growth of algal blooms and supports the process of Eutrophication
- Aquatic organisms like fish and zooplankton, use dissolved oxygen in the water for their survival. If the water body is accumulated with Silt, the oxygen level in the water gets reduced when it is filled with Silt, thus makes not suitable for aquatic life to survive
- Sometimes the silt gets accumulated on streets was a result of runoff water entering into residential streets due to the faulty storm drain. The surplus water is removed by the process of evaporation. But the Silt gets deposited on the roads itself which are capable of causing road accidents.

17. Consider the following stages involved in the decomposition process

1. Leaching
2. Fragmentation
3. Humification
4. Catabolism
5. Mineralisation

Arrange the above stages in chronological order of their occurrence?

- (a) 2-1-4-3-5
- (b) 2-4-1-3-5
- (c) 1-2-3-4-5
- (d) 1-3-2-4-5

Answer: a (2-1-4-3-5)

Explanation: The process of breaking down complex organic matter into inorganic substances like carbon dioxide, water, and nutrients by the decomposers is called decomposition. Dead plant remains like leaves, bark, flowers, and dead animals, including fecal matter, constitute detritus, the raw material for decomposition. The process of decomposition of organic matter includes.

- **Fragmentation:** The process by which detritivores (e.g., earthworms) break down detritus into smaller particles is called fragmentation.



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- Leaching: Through the process of leaching, water-soluble inorganic nutrients go down into the soil horizon and get precipitated as unavailable salts.
- Catabolism: Catabolism is the process through which Bacterial and fungal enzymes degrade detritus into simpler inorganic substances.
- Humification: Humification leads to the accumulation of a dark-coloured amorphous substance called humus which is highly resistant to microbial action and undergoes decomposition at a slow rate. Being colloidal in nature it serves as a reservoir of nutrients.
- Mineralisation: The humus is further degraded by some microbes and the release of inorganic nutrients occurs through the process known as mineralization.

18. Consider the following statements about Convention on the Protection and Use of Transboundary Watercourses and International Lakes

1. The Convention was originally negotiated as a regional framework for the pan-European region.
2. It is a legally binding convention which promotes Sustainable management of Shared water resources
3. India is one of the founding members of the convention
4. It helps countries to achieve Sustainable Development Goals (SDG) 6.5 and 6.6

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: The Convention was originally negotiated as a regional framework for the pan-European region. After an amendment was passed in march 2013 now, all UN Member States can accede to it.

Statement 2 is correct: The Convention on the Protection and Use of Transboundary Watercourses and International Lakes is known as the Water

Convention. The Water Convention is a unique, legally binding instrument promoting the sustainable management of shared water resources, the implementation of Sustainable Development Goals, the prevention of conflicts, and the promotion of peace and regional integration.

Statement 3 is incorrect: India has not signed nor ratified the convention in 1995 and not the additional protocol adopted in 2013.

Statement 4 is correct: SDG 6: Ensure availability and sustainable management of water and sanitation for all

Target 6.5: Ensure availability and sustainable management of water and sanitation for all

Target 6.6: By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes

19. Consider the following statements about forest resources in India

1. Forest Survey of India releases “The Indian State of Forest” report annually
2. As per the recent report Andhra Pradesh has recorded highest increase in the forest cover

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: b (Only 2)

Statement 1 is incorrect: The Forest Survey of India (FSI) has conducted a biennial assessment of the country's forest cover since 1987 and published it in the India State of Forest Report (ISFR). As per the recent report Forests cover 21.71% of total geographical area in the country.

Statement 2 is correct: An increase in forest cover has been observed in the open forest followed by very dense forest. A maximum increase in forest cover was witnessed in Andhra Pradesh (647 sq km), followed by Telangana (632 sq km) and Odisha (537 sq km).

20. Consider the following statements about Biological Diversity Act: 2002

1. It sets up a two-tier structure to regulate access to biological resources.



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2. The salaries and allowances payable to the members of the National Biodiversity Authority (NBA) shall be appropriated out of the Consolidated Fund of India.
3. NBA has the power to oppose the grant of intellectual property rights in any country outside India
4. The number of members of Biodiversity management committee shall not be less than 7 and not exceeding 11

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is incorrect: The Biological Diversity Act is implemented through a three-tiered institutional structure at the national, state and local levels.

- National Biodiversity Authority: At the National level
- State Bio-diversity Board: At State Level
- Bio-diversity management Committee: At village level

Statement 2 is correct: This act also provides that, the salaries and allowances payable to the members and the administrative expenses of the National Biodiversity Authority including salaries, allowances and pension payable to, or in respect of, the officers and other employees of the National Biodiversity Authority shall be defrayed out of the Consolidated Fund of India.

Statement 3 is correct: Section 18 (4) provided the NBA to restrict/oppose the grant of intellectual property right

18 (4): The National Biodiversity Authority may, on behalf of the Central Government, take any measures necessary to oppose the grant of intellectual property rights in any country outside India on any biological resource which is found in or brought from India, including those deposited in repositories outside India, or traditional knowledge associated thereto accessed.

Statement 4 is correct: Section 41 of Biological Diversity Act provides for the Constitution of Biodiversity Management Committee:

41. Constitution of Biodiversity Management Committee.—3 [(1) Every local body at the Gram Panchayat level in the rural areas and at the Nagar Panchayat or Municipal Committee at Municipal Corporation level in the urban areas shall constitute a Biodiversity Management Committee (by whatever name called) within its area for the purpose of promoting conservation, sustainable use and documentation of biological diversity including preservation of habitats, conservation of landraces, folk varieties, farmers' varieties, and cultivars, domesticated stocks and breeds of animals, living things in water bodies and microorganisms and chronicling of knowledge relating to biological diversity: Provided that the State Government may constitute Biodiversity Management Committees at the intermediate or district Panchayat level for achieving the objectives of the Act. (1A) The functions of Biodiversity Management Committee so constituted shall include conservation, sustainable use and documentation of biological diversity, including conservation of habitats, landraces, folk varieties, cultivars, domesticated breeds of animals, and microorganisms, and chronicling of traditional knowledge associated thereto relating to biological diversity (1B) The composition of the Biodiversity Management Committee shall be such as may be prescribed by the State Government: Provided that the number of members of the said Committee shall not be less than seven and not exceeding eleven.

21. Consider the following pairs about the different ecosystem services provided by nature

Type of Ecosystem Service	Example
Provisioning Service	Water, Food and Wood
Regulating Services	Waste water treatment
Supporting Services	Tourism
Cultural Services	Maintenance of Genetic Diversity

How many pairs given above are correctly matched?

- (a) Only one
- (b) Only two



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(c) Only three

(d) All four

Answer: b (Only two)

According to UN- FAO's Ecosystem Services & Biodiversity (ESB), Ecosystems provide four types of services to the world. They are Provisioning services, Regulating services, Supporting services and Cultural services

Pair 1 is correctly matched: Provisioning services includes

- Food
- Raw material
- Fresh water
- Medical resources

Pair 2 is correctly matched: Regulating services include

- Local Air quality
- Carbon sequestration and storage
- Moderation of extreme events
- Waste-water treatment
- Pollination
- Biological control
- Erosion prevention and Maintenance of soil fertility
- Regulation of water flow

Pair 3 is incorrectly matched: Supporting Services include

- Habitat for species
- Maintenance of genetic diversity

Pair 4 is incorrectly matched: Cultural services include

- Recreational and mental and physical health
- Tourism
- Aesthetic appreciation and inspiration for culture, art and design
- Spiritual experience and sense of place

22. Consider the following statements about the reasons for Sixth Mass Extinction

1. Over-exploitation of ecosystems
2. Loss and fragmentation of habitat
3. Co-extinction of species
4. Invasive alien species

How many of the above statements are correct?

(a) Only one

(b) Only two

(c) Only three

(d) All four

Answer: d (All four)

Explanation: Unlike previous extinction events caused by natural phenomena, the sixth mass extinction is driven by human activity, primarily (but not limited to) the unsustainable use of land, water, and energy use, and climate change.

- Habitat loss and fragmentation is the most important cause driving animals and plants to extinction. For example, habitat loss comes from tropical rainforests that cover more than 14 percent of the earth's land surface. Still, it covers not more than 6 percent as they were destroyed fast, and the degradation of many habitats by pollution also threatens the survival of many species.
- The large habitats are broken up into fragments due to various human activities, mammals, and birds requiring large territories, and certain animals with migratory habits are badly affected, leading to population declines.
- Humans have always depended on nature for food and shelter, but when 'need' turns to 'greed', it leads to the over-exploitation of natural resources. For example, Steller's Sea cow, passenger pigeon) were due to overexploitation by humans. Presently many marine fish populations worldwide are overharvested and endangered, which are commercially important species
- When a species becomes extinct, the plant and animal species associated with it in an obligatory way also become extinct. When a host fish species becomes extinct, its unique assemblage of parasites also meets the same fate. Another example is the case of a coevolved plant-pollinator mutualism where the extinction of one invariably leads to the extinction of the other.
- When alien species are introduced unintentionally or deliberately for whatever purpose, some turn invasive and cause the decline or extinction of indigenous species.



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For instance, biological invasion of species causes ecological disturbances that threaten native biodiversities like invasive weed species like carrot grass (Parthenium), Lantana, and water hyacinth (Eichhornia).

23. Consider the following statements about Battery Waste Management Rules

1. The rules cover all types of batteries except portable batteries
2. The rules list out limits and labelling requirements for batteries
3. These rules functions based on the concept of Extended Producer Responsibility principle
4. Manufactures are allowed to meet their targets by Purchasing Extended Producer Responsibility certificate from refurbishers

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is incorrect: The Battery Waste Management Rules cover all types of batteries include

- Electric Vehicle Batteries
- Portable Batteries
- Automotive Batteries
- Industrial Batteries

Statement 2 is correct: The Rules list out limits and labelling requirements for batteries. Labels have to indicate limits on the use of heavy metals like cadmium, mercury, and lead and also have a picture of a crossed-out bin to indicate that the batteries cannot be binned and have to be handed out to a registered battery collector.

Statement 3 is correct: Battery Waste Management Rules, 2022 was published by the Ministry of Environment, Forest and Climate Change, to ensure environmentally sound management of waste batteries. These rules mandated the producers of batteries to be responsible for the collection and recycling/refurbishment of waste batteries and the use of recovered materials from wastes into new batteries

by imposing the concept of Extended Producer Responsibility (EPR).

Statement 4 is correct: Producers have two ways to meet their targets. They either bear the responsibility of managing battery waste or use the EPR certificate by acquiring surplus certificates from producers of the same battery category made available by recyclers or refurbishes.

24. Consider the following statements about Colony collapse syndrome (CCS)

1. Heat wave condition is the major reason behind colony collapse syndrome
2. Pesticide poisoning of hive can also be categorised under CCS
3. CCS can hampers the process of pollination
4. It can disturb the entire food web in the ecosystem

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Colony Collapse Disorder is the phenomenon that occurs when the majority of worker bees in a colony disappear and leave behind a queen, plenty of food, and a few nurse bees to care for the remaining immature bees and the queen.

The mechanisms of CCD are still unknown, but many causes are currently being considered, such as pesticides, mites, fungi, beekeeping practices (such as the use of antibiotics or long-distance transportation of beehives), malnutrition, poor quality queens, starvation, other pathogens, and immunodeficiencies. The current scientific consensus is that no single factor is causing CCD, but that some of these factors in combination may lead to CCD either additively or synergistically

Statement 2 is incorrect: Certain pesticides are harmful to bees. That's why we require instructions for protecting bees on the labels of pesticides that are known to be particularly harmful to bees. This is one of many reasons why everyone must read and follow pesticide label instructions. When most or all of the bees in a hive are killed by overexposure to a



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pesticide, we call that a beekill incident resulting from acute pesticide poisoning. But acute pesticide poisoning of a hive is very different from CCD and is almost always avoidable. However pesticide poisoning can't be categorised under CCD.

Statement 3 is correct: Honey bees provide a fundamental level of Pollination of crops and, with the help of Pollination, yield most crops with wild bees. Therefore, colony collapse hampers or stops the pollination process in the environment.

Statement 4 is correct: They also play a critical role in many food webs that support wildlife but due to this disorder, disturbance in the food web will take place

25. Consider the following statements about Mangrove cover in India

1. Mangrove can be find in all ecological regions of the world
2. Mangroves cover 1.5% of total geographical area of the world
3. West Bengal has the largest area under Mangrove cover in the India

Which of the statements given above are incorrect?

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

Answer: a (1 and 2 only)

Statement 1 is incorrect: Mangrove plants are primarily found in tropical and sub-tropical tidal flats, and temperature appears to be critical to them. Mangrove species require a warm temperature to ensure respiration rates sufficient for maintenance and growth, particularly in roots. Hence they can't tolerate extreme cold temperatures prevalent in polar regions

Statement 2 is incorrect: The Mangrove Cover Assessment 2021 shows that the mangrove cover in India is 4,992 sq. km, which is 0.15 percent of the country's total geographical area.

Statement 3 is correct: West Bengal has highest area (2114 sq.km) under Mangrove cover followed by Gujarat (1175 sq.km).

26. Consider the following statements about Wetland

1. Wetland are spread in all continents of the world
2. Wetlands are successful at removing bacteria and other harmful pathogens that run off the land surface.
3. They are considered as Biological Supermarkets
4. Wetlands store and slowly release surface water, rain, snowmelt, groundwater, and floodwaters.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is incorrect: Wetlands exist in many kinds of climates on every continent except Antarctica. They vary in size from isolated prairie potholes to huge salt marshes and are found along coasts and inland. Some wetlands are flooded woodlands full of trees.

Statement 2 is correct: They are very successful at removing bacteria and other harmful pathogens that run off the land surface. This helps to keep our waterways safer for recreation and other uses.

Statement 3 is correct: They are considered biological supermarkets because they are comparable to rainforests and coral reefs for their diversity of food supply and wildlife species. And also for having extensive food webs, rich biodiversity, and unique habitats.

Statement 4 is correct: One acre of wetland can store up to one million gallons of water. They store and slowly release surface water, rain, snowmelt, groundwater, and floodwaters Wetland vegetation slows the movement of flood waters and distributes them more gradually over floodplains.

27. Consider the following statements about Estuaries

1. Water in Estuaries is moderately variable in Salinity
2. Blind Estuaries are seasonal in nature
3. There is a lack of uniformity among tropical estuaries in terms of depth, physical and chemical features.



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4. A number of estuaries in Tamil Nadu and Karnataka coasts are usually relatively small, both in length and catchments areas.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is incorrect: Estuaries are the transitional zones between the rivers and sea and have specific ecological properties and biological composition. The salinity of fresh water is nearly zero, and the ocean water is 35 ppt. The mixture of seawater and fresh water in estuaries is called brackish water and the salinity of estuarine water can range from 0.5 to 35 ppt. And also the salinity of estuarine water varies from estuary to estuary and can change from one day to the next depending on the tides, weather, or other factors. Thus, Estuarine water is **extremely variable** in its salinity, while marine and freshwater have distinctive stable salinities

Statement 2 is correct: The blind estuaries are usually relatively small, both in length and catchment areas. During summer these estuaries are temporarily closed by a sand bar across the sea mouth and during this period there is no tidal range and thus no tidal currents.

Statement 3 is correct: The characteristics of each estuary depend upon the local climate, freshwater input, tidal patterns, and currents. The tropical estuaries vary in terms of size, depth, physical and chemical features, and other environmental factors such as the nature of the adjacent marine and freshwater habitats.

Statement 4 is correct: A number of estuaries in Tamil Nadu and Karnataka coasts are usually relatively small, both in length and catchments areas and seasonal in variation.

28. Consider the following statements

- 1. Bio-sphere reserve and National parks are example of ex-site conservation strategy
- 2. Human activities are allowed in all three bio-sphere reserve zones

3. Transaction of lawful business with any person residing in the wildlife sanctuary is granted as per wildlife protection act of 1972

4. The State Government has the sole authority to include any part of the territorial waters as a National park within its boundaries.

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Statement 1 is incorrect: In-Situ conservation is when species are protected within its natural habitat.

Examples are

- Biosphere reserve
- National parks
- Wildlife Sanctuaries

Statement 2 is incorrect: Human activities is allowed in Buffer and Transition zone not in the Core zone where only research is permitted in this zone. The core zone is to be kept free from human pressures external to the system. So, no human activity is allowed. In Buffer Zone, the human activities, if natural within BR, are likely to continue if they do not adversely affect the ecological diversity. The Transition zone the outermost part of Biosphere reserve includes settlements, crop lands, managed forests and area for intensive recreation and other economic uses where limited human activities are permitted.

Statement 3 is correct: According to Wildlife Protection Act, The Chief Wild Life Warden may permit any person to enter or reside in a sanctuary, on application for purposes such as

- Investigation or study of wild life and purposes ancillary or incidental thereto
- Photography
- Scientific research
- Tourism
- Transaction of lawful business with any person residing in the sanctuary.

Statement 4 is incorrect: The State Government should obtain prior concurrence of the Central Government to include any part of the territorial waters as a national park. Also, the limits of the area



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of the territorial waters to be included in the national park shall be determined in consultation with the Chief Naval Hydrographer of the Central Government.

29. Which of the following is correct about “Forever Chemicals” recently seen in news?

- (a) Bisphenol A
- (b) Organohalides
- (c) Per and polyfluoroalkyl substances
- (d) Organobromine compounds

Answer: c (Per and polyfluoroalkyl substances)

Explanation: Per and Polyfluoroalkyl substances (PFAs) are called “Forever Chemicals” because they tend to stick around in the atmosphere, rainwater, and soil for long periods. They are a large chemical family of over 4,700 highly persistent chemicals that don’t occur in nature. P.F.A.s are man-made chemicals used to make non-stick cookware, water-repellent clothing, stainresistant fabrics, cosmetics, firefighting forms, and many other products that resist grease, water, and oil. They do not break down and remain in the environment for long periods. Some of these PFAs can build up in people and animals if they are repeatedly exposed to the chemicals.

30. Consider the following pairs about different Symbiotic relationships between species and their examples

Symbiotic Relationship	Example
Ammensalism	Mycorrhizae and roots of the plant.
Commensalism	Barnacles growing on the back of a whale
Predation	Tulsi herbs and Seeds of plant grown around it
Mutualism	Pisaster and mussels

How many pairs given above are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Pair 1 is incorrectly matched: Amensalism is a negative association between two species in which

one species harms or restricts the other species without itself being adversely affected or harmed by the presence of the other species. The best example of this type of biotic interaction is Tulsi herbs and Seeds of plant grown around it.

Pair 2 is correctly matched: Commensalism is an interspecific interaction where one species benefits and the other is unaffected (neither harmed nor benefitted). Commensal relationships may involve one organism using another for transportation or housing. For example, a commensalistic relationship exists between barnacles and humpback whales, like various species of barnacles attach themselves to the skin of whales.

Pair 3 is incorrectly matched: The Predation type of interaction is when a predator captures, kills, and eats an animal of another species called the prey. The predator naturally benefits from this relationship Pisaster ochraceus is the keystone predator commonly known as purple sea stars and is a major predator of mussels and barnacles on Tatoosh Island in the U.S. Pisaster ochraceus sea stars were the first animals to be identified as keystone species

Pair 4 is incorrectly matched: Mutualism is an interaction between individuals belonging to two species that benefit both members. Some mutualisms are so intimate that the interacting species can no longer live without each other as they depend totally on each other to survive. Such close associations are called symbiosis. For example, Mycorrhizae are a symbiotic or mutualistic association between plant roots and fungi. Mycorrhizae are a mutualistic symbiosis between certain types of soil fungi and the roots of most vascular plants

31. Consider the following statements about Nutrient cycles

1. There are two types of reservoirs in any nutrient cycle
2. All nutrient cycles operates as a closed systems
3. Sulphur cycle has both gaseous and sedimentary phase
4. The rate of movement of nutrients between two reservoirs is known as flux rate

How many statements given above are correct?



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- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: Reservoir is a body which stores large amounts of nutrients. The reservoirs are of two types: nonbiological and biological reservoirs. The non-biological reservoirs include air (atmosphere), water (hydrosphere) and soil (lithosphere). The biological reservoirs are the living organisms.

Statement 2 is correct: A nutrient Cycle also known as biogeochemical cycle is the cycle in which nitrogen, carbon, and other inorganic elements of the soil, atmosphere, etc. of a region are converted into the organic substances of animals or plants and released back into the environment. The movement of nutrients within the biosphere occurs in a cyclic manner, from environment to organisms and back to the environment. Therefore, the system as a whole does not lose nutrients. This makes all nutrient cycles to operate as a closed system.

Statement 3 is correct: The sulphur cycle has both sedimentary and gaseous phases. It provides nutrients for the plants in the form of sulphate. In the sedimentary phase of sulphur cycle, sulphur is tied up in organic and inorganic deposits and is released by decomposition and weathering, respectively. The pyrite rocks are one such example of a sulphur deposit. As a result, sulphur is made available for the use of plants. The gaseous phase of the cycle allows the circulation of sulphur in the atmosphere.

Statement 4 is correct: The rate of movement of nutrients between two reservoirs along these pathways is called the flow rate or flux rate. The speed of movement depends on the physical and chemical properties of each nutrient.

32. Consider the following statements about Ecological Pyramids

- 1. Pyramid of energy is always upright
- 2. Pyramid of biomass of aquatic ecosystem is always inverted in shape
- 3. Tree ecosystem is a good example for inverted pyramid of numbers

4. Ecological pyramids helps to understand the Ecological Niche of species

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: The pyramid of Energy is always upright. Both the energy availability and the net productivity steadily decline when the energy is transferred from one trophic level to the next. Only 10% of energy is transferred from one trophic level to another trophic level in the food chain. The remaining energy is lost through the organism's metabolic activities such as heat production, respiration.

Statement 2 is correct: The aquatic ecosystem's biomass pyramid is inverted. The biomass of primary producers in this area is significantly lower than that of zooplankton, which is lower than that of small fish and large fish, which have the highest biomass.

Statement 3 is correct: An inverted pyramid of numbers can be seen in the tree ecosystem and parasite food chain. The number of producers in the tree ecosystem is the smallest, and the population of consumers grows at each trophic level. The producers (trees) are in the narrowest area of the pyramid because they are the smallest.

Statement 4 is correct: Ecological pyramids help us to understand the habitat and other food requirements and energy sources needed to a particular species thereby the entire Niche. This will help us to better conserve species outside their natural habitat.

33. Consider the following statements

- 1. Species may occupy more than one trophic level in the same ecosystem at the same time
- 2. Only 10% of energy is transferred from one trophic level to another higher trophic level

Which of the statements given above are correct?

- (a) Only 1
- (b) Only 2
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: c (Both 1 and 2)



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Statement 1 is correct: Depending on their trophic level, the source of their nourishment or food organisms occupy different positions along the food chain. More than one trophic level may be occupied by a single species. For instance: The sparrow is an omnivore, It occupies the primary trophic level when it consumes seeds, fruits, or any other type of plant product. When it consumes worms and other insects, however, it is at the secondary trophic level. Thus, it occupies more than one trophic level in the same ecosystem.

Statement 2 is correct: Only 10% of energy is transferred from one trophic level to another trophic level in the food chain. The remaining energy is lost through the organism's metabolic activities such as heat production, respiration and the net productivity steadily decline when the energy is transferred from one trophic level to the next level.

34. Consider the following statements about Arsenic pollution

1. Arsenic is widely distributed in the environment in the air, water and land
2. As per Bureau of Indian Standards the maximum permissible limit of Arsenic in drinking water is 1 mg/l.
3. Ganga and Brahmaputra river basins have highly effected zones in terms of Arsenic contamination of ground water

Which of the statements given above are correct?

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

Answer: b (1 and 3 only)

Statement 1 is correct: Arsenic is a natural component of the Earth's crust and is widely distributed throughout the environment in air, water and land. Arsenic is highly toxic in its inorganic form whereas these are found in soils, sediments, and groundwater which occur naturally or as a result of mining, ore smelting, and industrial use of Arsenic. Arsenic and its compounds, especially the trioxide, are used in the production of pesticides, treated wood products, herbicides, and insecticides. These

applications are declining due to the toxicity of arsenic and its compounds.

Statement 2 is incorrect: As per Bureau of Indian Standards (BIS) (IS 10500: 2012) the maximum permissible limit of Arsenic in drinking water is 0.01 mg/L (ppm) or 10 µg/L (ppb) and not 1 mg/L. If consumed in greater amount than the permissible limits, Arsenic can cause several skin problems including Arsenicosis characterised by dark spots on body and limbs, thickening of palms and soles etc

Statement 3 is correct: In India, the Arsenic contamination in groundwater in the Ganga and Brahmaputra fluvial plains is reported as one of the world's biggest natural groundwater calamities to the mankind. West Bengal, Jharkhand, Bihar, Uttar Pradesh in the flood plain of the Ganga River; Assam and Manipur in the flood plain of the Brahmaputra and Imphal rivers and Rajnandgaon village in Chhattisgarh state have so far been reported affected zone by Arsenic contamination in groundwater above the permissible limit of 10 µg/L.

35. Consider the following statements about Bharat Stage (BS – VI) norms

1. BS-VI norms are introduced as part of the Auto Fuel Vision Policy 2025 after the successful implementation of BS-V norms
2. Octane number of fuel determines the quality of a fuel
3. Octane number and olefin content in BS VI norms match Euro 6 values
4. Particulate Matter in diesel cars will be reduced by 80% compared to BS-IV norms.

How many statements given above are incorrect?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Statement 1 is incorrect: Bharat Emission Standards (BS) are instituted by the Government of India to regulate the amount of air pollutants from internal combustion engines, including those that vehicles can emit. In 2014, the Saumitra Chaudhary committee gave recommendations on the Auto Fuel Vision Policy 2025 which recommended the implementation



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of BS-VI Emission Norms to be applied throughout the country by 2024.

Statement 2 is correct: Octane number, also called Antiknock Rating, measure of the ability of a fuel to resist knocking when ignited in a mixture with air in the cylinder of an internal-combustion engine. Higher the octane number higher the quality of fuel

Statement 3 is correct: Indian gasoline specifications set stringent motor vehicle emission control parameters of octane number and olefin content specifications for premium grade BS VI gasoline, which matches with the Euro 6 values.

Statement 4 is correct: India would directly progress from BS-IV norms to BS-VI, skipping the intermediary stage. By following the BS-VI norms, an 80% reduction in Particulate Matter emissions in diesel cars and a 30% reduction in NOx emissions in BS-IV heavy-duty diesel vehicles, compared with BS-III norms can be seen.

36. Consider the following features

1. Poor nutrient soil
2. Trees and plants have shallow reaching roots
3. There are no seasons
4. Potential in waste management techniques
5. Contribute to public health

The above statements better describe which of the following ecosystem?

- (a) Tropical Evergreen rain forest
- (b) Tropical deciduous forest
- (c) Mountain vegetation
- (d) Tundra ecosystem

Answer: a (Tropical Evergreen rain forest)

Explanation: Tropical rainforests are the type of forests in tropical regions with very high rainfall. It is also described as a thermostat because it contributes 20% of oxygen and also absorbs a huge amount of carbon-dioxide, drastically reducing the impact of greenhouse gas emissions which helps the public prevent various breathing problems. It is estimated that 25% of all our medicines come from plants growing in the rainforest. For example, Vincristine, a drug taken from the rosy periwinkle of Madagascar has allowed an 80% remission rate for some forms of childhood leukemia.

The high temperature and moisture of tropical rainforests cause dead organic matter in the soil to decompose more quickly than in other climates, thus releasing and losing its nutrients rapidly. The high volume of rain in tropical rainforests washes nutrients out of the soil more quickly than in other climates. So the soil is poor in nutrient content.

A mushroom discovered in the tropical rainforest of Ecuador, for example, is capable of consuming polyurethane a hard, durable type of plastic used in everything from garden hoses to carpets to shoes. The fungi can even consume plastic in an oxygen-free environment, leading many environmentalists and businesses to invest in research to investigate if the fungi can help reduce waste in urban landfills. Tropical rainforest thus helps in waste management. The soil of most tropical rainforests contains few nutrients. The rich biodiversity in the canopy and quick decomposition from fungi and bacteria prevent the accumulation of nutrient-rich humus. Nutrients are confined to topsoil. For this reason, most of the towering trees in tropical rainforests have very shallow, widespread root system called "Butter roots". Rainforest soils are poor and most nutrients are in the top layers, so roots are generally shallow. Tropical rainforest areas do not experience seasons like summer, winter, spring, or autumn. Instead, seasons in tropical rainforests are categorized into dry and wet seasons. Each season lasts approximately 6 months.

37. Consider the following statements about Convention on Long-Range Transboundary Air Pollution

1. It is being implemented by United Nations Environment Programme
2. Gothenburg protocol is part of this convention is aimed at reducing acidification, Eutrophication and Ground level ozone
3. Gothenburg protocol setting emission ceilings for Sulphur dioxide, nitrogen oxide, volatile organic compounds and ammonia

Which of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three



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(d) None of the above

Answer: b (Only two)

Statement 1 is incorrect: The Convention on Long-Range Transboundary Air Pollution, often abbreviated as Air Convention or CLRTAP, is intended to protect the human environment against air pollution and to gradually reduce and prevent air pollution, including long-range transboundary air pollution. It is implemented by the European Monitoring and Evaluation Programme (EMEP), directed by the United Nations Economic Commission for Europe (UNECE).

Statement 2 is correct: The 1999 Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (known as the Multi-effect Protocol or the Gothenburg Protocol) is a multi-pollutant protocol designed to reduce acidification, eutrophication and ground-level ozone.

Statement 3 is correct: This protocol is setting emission ceilings for Sulphur dioxide, nitrogen oxides, volatile organic compounds and Ammonia

38. Consider the following pollutants

1. Carbon dioxide
2. Silica
3. Chromium
4. Aromatic Hydrocarbons
5. Polychlorinated dibenzodioxins (PCDDs)
6. Thorium
7. Hydrogen Fluoride

How many of the above pollutants are released from Cement industry?

- (a) All the above except one
- (b) All the above except two
- (c) All the above except three
- (d) All the above

Answer: d (All the above)

Explanation: A mixture of calcareous and argillaceous raw materials, as well as necessary correction elements, are burned at high temperatures in a kiln to produce cement. The resulting clinker is then finely ground with gypsum. The finished product is known as Ordinary Portland Cement (OPC).

The main pollutants released from Cement industry includes

- Sulphur dioxide and other sulphur compounds

- Carbon dioxide
- Oxides of nitrogen (NO_x) and other nitrogen compounds
- Polychlorinated dibenzodioxins and dibenzofurans (PCDDs and PCDFs), metals and their compounds.
- Oxides of nitrogen (NO_x) and other nitrogen compounds.
- Hydrochloric Acid (HCl)
- Hydrogen Fluoride
- Silica dust from the cement plant causes silicosis and fatal lung diseases. The presence of chromium compounds in cement dust might lead to cancer

39. Consider the following statements about Basel Convention on the Control of Transboundary Movement of Hazardous Waste and their Disposal

1. It prevents the transfer of hazardous waste from developed to less developed countries
2. It didn't cover the movement of radioactive waste
3. The convention's prior informed consent procedure will be applicable to movement of electronic waste
4. Damage caused due to illegal traffic in transboundary movement of hazardous wastes and other wastes invites compensation under the Basel protocol

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually known as the Basel Convention, is an international treaty that was designed to reduce the movements of hazardous waste between nations, and specifically to prevent transfer of hazardous waste from developed to less developed countries.

Statement 2 is correct: It does not, however, address the movement of radioactive waste. The convention is also intended to minimize the rate and toxicity of



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wastes generated, to ensure their environmentally sound management as closely as possible to the source of generation, and to assist developing countries in environmentally sound management of the hazardous and other wastes they generate.

Statement 3 is correct: During the Fifteenth Meeting of the Conference of the Parties to the Basel Convention, the Conference of the Parties adopted amendments to Annexes II, VII, and IX of the Convention, upon the proposal by Ghana and Switzerland. subjecting all transboundary movements of electronic wastes, whether hazardous or not, to the conventions prior informed consent procedure.

Statement 4 is correct: The objective of the Protocol is to provide for a comprehensive regime for liability as well as adequate and prompt compensation for damage resulting from the transboundary movement of hazardous wastes and other wastes, including incidents occurring because of illegal traffic in those wastes.

40. Consider the following features

1. Their productivity is higher than temperate grasslands
2. They are deciduous, drought resistant and woody
3. There are very few amphibians and reptiles in these forests
4. They are characterised by gymnosperms

The above features best describes, which of the following Biome?

- (a) Tundra Biome
- (b) Taiga Biome
- (c) Temperature forests
- (d) Tropical rain forests

Answer: b (Taiga Biome)

Explanation: Productivity is defined as the total accumulated amount of energy stored by the autographic primary producers per unit area per unit time. The productivity of the tropical rainforest biome is the highest of all biome types of the world. Productivity of tundra biome is the least. The productivity of the Taiga biome is 3500 kilocalories/square meter/year and productivity of temperate grasslands is 2000 kilocalories/square

meter/year. Hence, the productivity of Taiga Biome is greater than Temperate Grassland

Conifers or Taiga tend to be evergreen (not deciduous) they bear needles all year long, and they are evergreen, drought resistant, and woody in nature. In many species, the canopy is cone-shaped. These adaptations help conifers survive in areas that are very cold or dry. Some of the more common conifers are spruces, pines, and firs.

The cold winters (and short summers) make the taiga a challenging biome for reptiles and amphibians, which depend on environmental conditions to regulate their body temperatures. There are only a few species in the boreal forest, including red-sided garter snake, common European adder, blue-spotted salamander, northern two-lined salamander, Siberian salamander, wood frog, northern leopard frog etc.

Coniferous forests are also known as Taiga or Boreal forests. They extend as a continuous belt across north America and north Eurasia below the arctic tundra. These are characterized by conifers (gymnosperms), as trees that grow needles instead of leaves and cones instead of flowers.

41. Consider the following statements about desert ecosystems

1. Warm ocean currents are the main reason behind coastal deserts
2. Changes in circulation patterns of air masses are the main reasons behind Subtropical deserts
3. They occupy one seventh of the land area on the Earth surface
4. Temperature is very high in all desert ecosystems

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Cold ocean currents contribute to the formation of coastal deserts. Air blowing toward shore, chilled by contact with cold water, produces a layer of fog. This heavy fog drifts onto land. Although humidity is high, the atmospheric



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changes that normally cause rainfall are not present. A coastal desert may be almost totally rainless yet damp with fog. The Atacama Desert, on the Pacific shores of Chile, is a coastal desert.

Statement 2 is correct: Subtropical deserts are caused by the circulation patterns of air masses. They are found along the Tropic of Cancer, between 15 and 30 degrees north of the Equator, or along the Tropic of Capricorn, between 15 and 30 degrees south of the Equator.

Statement 3 is correct: Deserts are waterless barren regions of the earth. They occupy about one-seventh of the land on the Earth surface. Deserts form an extreme condition in a sequence of ecosystems with respect to climatic conditions. They occur in two belts that encircle the northern and southern hemispheres, roughly centred over the tropics of Cancer and Capricorn.

Statement 4 is incorrect: In the Desert ecosystem, annual rainfall is very little. It may be less than 25 cm per annum. In some places, if it is high, it is unevenly distributed. The temperature may be very high in subtropical deserts and very low in cold deserts e.g. Ladakh. The winds here have high velocity. Thus, the Temperature is not very high in all deserts.

42. Consider the following statements about Grassland biome

1. They represent a transition zone between two ecosystems
2. They are subjected to lesser variation of temperature, moisture, wind and light intensity of the sun
3. They occur in both tropical and temperate regions of the world
4. They occupy largest portion of the land on earth's surface compared to the other biomes

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Grassland are found where there is regular rainfall to support the growth of a forest, but not so little were a desert forms. Thus,

grasslands act as ecotone (a zone in between two ecosystems) that often lie between forest and deserts

Statement 2 is incorrect: Grasslands often experience very high intra- and interannual variability in rainfall, and comparisons with other biomes indicate that grasslands are more responsive to variation in rainfall amounts than most other biomes. This may occur because the relatively high density of plants and associated meristematic tissue (growing points) in grasslands results in greater growth potential when water is available relative to more arid regions. Thus, the grasslands have a higher variation of temperature, moisture, wind, and light intensity of the sun.

Statement 3 is correct: Grasslands occur in tropical and temperate regions and are called tropical grasslands and temperate grasslands. Tropical grasslands include the hot savannas of sub-Saharan Africa and northern Australia. The important temperate grasslands include the steppe in Eurasia, the prairies of North America, the downs of Australia and New Zealand, and the pampa of Argentina.

Statement 4 is incorrect: Grasslands and other grass- and graminoid-dominated habitats (e.g., savanna, open and closed shrubland, and tundra) occur on every continent except Antarctica (though some grasses occur there) and occupy only about 20 % of Earth's land surface. Whereas for example, forests itself cover above 30 percent of the Earth's surface.

43. Consider the following statements about Persistent Organic Pollutants (PoPs)

1. These are chemicals of global concern which have the ability to biomagnify and bioaccumulate in humans and the environment.
2. It can damage the reproductive and immune systems of exposed individuals as well as their offspring.
3. Dichlorodiphenyltrichloroethane (DDT) is listed in Annex A of the Stockholm convention
4. The World Health Organization advocates avoiding breastfeeding in infants due to the presence of Dioxins in breast milk

How many statements given above are correct?



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- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Persistent Organic Pollutants (POPs) are organic chemical substances, that is, they are carbon-based. They possess a particular combination of physical and chemical properties. They are chemicals of global concern due to their potential for long-range transport, persistence in the environment, ability to biomagnify and bioaccumulate in ecosystems, and their significant negative effects on human health and the environment.

Statement 2 is correct: Specific effects of POPs can include cancer, allergies and hypersensitivity, damage to the central and peripheral nervous systems, reproductive disorders, and disruption of the immune system. Some POPs are also considered to be endocrine disrupters, which, by altering the hormonal system, can damage the reproductive and immune systems of exposed individuals as well as their offspring and they can also have developmental and carcinogenic effects.

Statement 3 is incorrect:

Dichlorodiphenyltrichloroethane (DDT) is currently listed in Annex B to the Stockholm Convention, this annex states that Parties must take measures to restrict the production and use of the chemicals listed under Annex B in light of any applicable acceptable purposes and/or specific exemptions listed in the Annex.

Statement 4 is incorrect: WHO has collected and evaluated information on levels of persistent organic pollutants in foods, including breastmilk, maternal blood, and adipose tissue, which are all relevant matrices for assessing body burdens for persistent organic pollutants. After the Biomonitoring of breastmilk, data provides information on the exposure of the mother and the infants and recognizes that breastmilk is an ideal matrix of persistent organic pollutants in the environment. The levels of pesticide POPs in human milk are very low. And also, given that breastfeeding reduces child mortality and has health benefits that extend into adulthood, every

effort has been made to protect, promote and support breastfeeding. Therefore, the World Health Organization does not advocate avoiding breastfeeding.

44. Consider the following pairs about important species types and their examples

Type of Species	Example
Indicator species	Mayflies
Umbrella species	Giant Panda
Keystone species	Starfish
Foundational species	Kelp forests

How many pairs given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Pair 1 is correctly matched: Indicator species are biological indicator whose presence indicates the health of ecosystem. Mayflies are used for testing environmental quality. They are vulnerable to silting and pollution, and found rarely in degraded bodies of water. By this way their presence is an indicator of improving water quality

Pair 2 is correctly matched: An “Umbrella” species are those whose protection indirectly protects many other species in the ecosystem. Umbrella species are selected for making conservation-related decisions. The Giant Panda act as the umbrella species whose conservation effort conserve the entire habitat. The measures taken in China to protect the Giant Panda have also benefited a number of other threatened species, including birds, mammals and amphibians. Whereas Tiger is considered as Umbrella Species in India.

Pair 3 is correctly matched: Keystone species is one whose addition or loss to an ecosystem will lead to major changes in the ecosystem. These species play an important role in determining the presence of other species in the ecosystem. Starfish acts as Keystone Species of marine environment as they play an important role in maintaining the ecological balance. They keep in check and prevent other species like mussels, barnacles, limpets, etc. from taking over the



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ecosystem by feeding on them and controlling their populations.

Pair 4 is correctly matched: Foundation species are habitat-forming organisms which defines the ecosystem and control the biological diversity of associated species. These are dominantly primary producers in an ecosystem but can occupy any trophic level in a food web. Kelp forests are underwater habitats which are one of the most productive natural ecosystems on the planet. Kelps act as foundation species because they are primary producers who modify the environment to provide habitat for a wide range of species.

45. Consider the following diseases that are results of air pollution

1. Stunted brain development
2. Pulmonary heart disease
3. Pneumonia
4. Tuberculosis
5. Leukaemia
6. Ischaemic heart disease

How many statements given above are correct?

- (a) All the above
- (b) All the above except one
- (c) All the above except two
- (d) All the above except three

Answer: a (All the above)

Explanation: The oxygen supply is required for brain development and functioning. Recently in a study, researchers have found that Breathing PM 2.5, even at low levels, may alter the size of a child's developing brain which results in stunt brain development. Also in some cases, decreased oxygen content in the inhaled air leads to loss of memory.

Pulmonary heart disease refers to altered structure (enlargement) and failure of function of the right ventricle occurring in association with abnormal respiratory function. Air pollution has an inflammatory effect on the heart and leads to chronic cardiovascular diseases.

Pneumonia is a type of lung infection in which air sacs in one or both lungs get inflamed and may be filled with fluid. Pneumonia can be caused by viruses, bacteria or fungi. Bacterial pneumonia is the most

common type in adults. Pneumonia can often be life-threatening and has a high mortality risk.

Tuberculosis is a contagious infection caused by bacteria (Mycobacterium) that mainly affects the lungs but can also affect any other organ including bone, brain and spine. In a recent study it is found that people who are continuously exposed to high levels of ambient air pollution experience high rates of tuberculosis.

Leukaemia is a type of blood cancer which is usually associated with exposure to benzene vapors. Leukaemia is one of the common diseases caused by air pollution.

46. Consider the following pollutants

1. Chlorofluorocarbons
2. Ozone
3. Ammonia
4. Nitrogen dioxide
5. Oxides of Carbon
6. Peroxyacyl nitrates

How many of the above are primary pollutants?

- (a) All the above except one
- (b) All the above except two
- (c) All the above except three
- (d) All the above except four

Answer: b (All the above except two)

Explanation: Primary pollutants are directly emitted from the source, whereas secondary pollutants are not directly emitted but form when other pollutants (primary pollutants) react in the atmosphere.

- Chlorofluorocarbons (CFCs) are nonflammable and long-lived compounds released into the atmosphere by refrigerators, air conditioners, sprays, fire extinguishers, and paints. So, it's called primary pollutants.
- Ammonia is the most abundant alkaline gas in the atmosphere. The largest source of NH₃ emissions is agriculture, including animal husbandry and NH₃-based fertilizer applications, Which is a primary pollutant.
- Nitrogen dioxide is the primary pollutant because it is directly released into the atmosphere from human activities like the combustion of fossil fuels (coal, gas and oil), especially fuel used in cars.



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- Carbon Oxides are the primary pollutant directly released into the atmosphere from human and Natural sources.

Some examples for secondary pollutants

- Ozone
- Sulfuric acid and nitric acid (a component of acid rain)
- Particulate matter
- Peroxyacyl nitrates (PANs)- Peroxyacyl nitrate is a secondary pollutant in photochemical smog. It is thermally unstable and breaks down into nitrogen dioxide gas and peroxyethanoyl radicals. It irritates the lungs and eyes because it is a lachrymatory chemical

47. Consider the following statements about Endosulfan

1. It is a crystalline insecticide used in food crops
2. It is a neurotoxin
3. Use of endosulfan is banned by Stockholm convention of persistent organic pollutants

Which of the statements given above are correct?

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

Answer: d (1, 2 and 3)

Statement 1 is correct: Endosulfan is a cyclodiene-subgroup chlorinated hydrocarbon insecticide and acaricide that poisons a variety of insects and mites upon contact. Although it can also be used as a wood preservative, its main application is on a range of food crops, such as rice, cereals, maize, sorghum, and other grains, as well as tea, coffee, fruits, and vegetables.

Statement 2 is correct: Endosulfan is severely neurotoxic to mammals, including humans and insects. Endosulfan's harmful impacts impede the nervous system's natural growth at a time when it is most vulnerable and the groundwork for a healthy adult body is being laid.

Statement 3 is correct: Due to the chemical's hazards to the environment and human health, the Stockholm Convention enacted a global ban on its production and use in 2011. In order to develop alternatives to

endosulfan, the Convention's Persistent Organic Pollutants Review Committee recommended its prohibition and will consult with parties and observers. The Convention will also approve financial aid for developing nations to use alternatives to endosulfan.

48. Consider the following statements about environmental impacts of invasive alien species

1. Increased frequency of wildfires
2. Increased frequency of flooding
3. Pollution
4. Water shortages
5. Detrimental to all organisms in an ecosystem

How many statements given above are correct?

- (a) All the above except one
- (b) All the above except two
- (c) All the above except three
- (d) All the above except four

Answer: a (All the above except one)

Explanation: The Invasive alien plant species (IAPS) can invade aquatic systems by changes in physiological characteristics like high biomass and high evapotranspiration. It also tends to increase the flood frequency by narrowing the stream channels and altering soil attributes (e.g., decreased water holding capacity and increased soil erosion), which eventually harms the riparian (situated on the banks of a river) native plant communities, for example, Castor canadensis Invasive alien plant species (IAPS) troubles water quality and increases the flood risk and also affect the quantity of surface and groundwater, for example, IAPS, Prosopis pallida, a Nitrogen fixing in arid regions of exploits groundwater resources to a level that alters the soil environment. It can also exploit an enormous amount of water, leading to Water shortages, i.e., water scarcity.

Native plants can act as a sink for air pollutants and contribute significantly to carbon sequestration. Extreme pollution stress has been reported that IAPS may act as an ecological indicator of environmental pollution. For example, the spread of a plant pathogen, the invasive Emerald Ash Borer beetle (*Agrilus planipennis*), decimates some of the most prominent ash tree species in North America. It can



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potentially destroy over eight billion ash trees, which otherwise acted as an effective sink for air pollutants. Invasions by alien plants indirectly affect native plants and change ecosystems by promoting or suppressing fire. They reduce the resilience of natural habitats, making them more vulnerable to the impacts of climate change. For example, some grasses and trees that have become I.A.S. can significantly alter fire regimes, especially in areas that are becoming warmer and drier and increases the frequency and severity of wildfires.

Note: Invasive alien species (I.A.S.) are animals, plants, or other organisms introduced into places outside their natural range, negatively impacting native biodiversity, ecosystem services, or human well-being. Global Assessment Report on Biodiversity and Ecosystem Services of the U.N., recently declared the impacts of invasive alien species as the major driver of biodiversity loss, reducing the biodiversity of native plants. Whereas it also benefits some species in an ecosystem. Example: Invasive species such as autumn olive, oriental bittersweet, and honeysuckle produce fruit that is eaten by the fruit-eating bird species. Thus they benefit certain species and not detrimental to all species in an ecosystem

49. Consider the following statements

1. They are small nocturnal mammals
2. It acts as a biological predator of pests in agricultural crops
3. India's only sanctuary specifically to protect this species is located in Tamil Nadu

The above statements best describes the which of the below species?

- (a) Nilagir Tahr
- (b) Slender Loris
- (c) Grizzled giant squirrel
- (d) Malabar Civet

Answer: b (Slender Loris)

Explanation: Commonly found in the tropical scrub and deciduous forests as well as the dense hedgerow plantations bordering farmlands of Southern India and Sri Lanka, the Slender Loris is a small, nocturnal primate. It prefers to inhabit thick, thorny bushes and bamboo clumps where it can evade predators and also find insects, which is its main diet. They are arboreal

(living in trees) in nature as they spend most of their lives on trees. This species acts as a biological predator of pests in agricultural crops and benefits farmers. Recently, Tamil Nadu notifies India's first slender loris sanctuary called Kaduvur slender loris sanctuary covering 11,806 hectares in Karur and Dindigul districts.

50. Consider the following statements about Ecotones

1. It is a transition zone between two different eco-systems
2. Species richness and evenness is higher compared to the original ecosystems
3. The edge organisms can exhibit the features of both ecosystems
4. Wetlands are the good examples for Ecotones

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: An Ecotone is a zone when an ecosystem/community abruptly transitions from one to another. This zone can traverse lengthy portions of two ecosystems and is a site where both ecosystems' traits can be seen.

Statement 2 is correct: They influence patterns of species richness, evenness, and habitat selection across ecosystems. The dynamics and characteristics of ecotones help us understand ecosystem geometry and functioning.

Species Richness: Species richness is a measure of the number of different types of species in an ecosystem. A large number of different species in a habitat represents a higher species richness, and an overall more diverse ecosystem

Species Evenness: Species evenness is a measure of the relative abundance of each species.

Statement 3 is correct: Ecotones are difficult environments for inner organisms, but they are rich in opportunities for edge organisms. The edge effect is when an abrupt transition between two quite different adjoining ecological communities on the numbers and kinds of organisms in the marginal habitat.



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Statement 4 is correct: The effect of an abrupt transition between two quite different adjoining ecological communities on the numbers and kinds of organisms in the marginal habitat. Thus Wetlands are good examples of Ecotone.

51. Consider the following statements about Biomes

1. Same type of climate, vegetation, soil quality can be found in a biome
2. Terrestrial Biomes has the largest spread than aquatic biomes in the world
3. All types of biomes can be found in India
4. Understanding of Biomes will help us in species conservation efforts

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: A collection of multiple ecosystems consisting of many communities that are surviving on the same type of climate, soil quality, vegetation, water availability, etc. It can be considered as an area that is classified based on the biotic communities living in a specific abiotic condition. Biomes can be classified based on the condition of the climate or based on the type of vegetation found.

Statement 2 is incorrect: The aquatic biome is the largest of all the biomes, covering about 75 percent of Earth's surface.

Statement 3 is incorrect: In India, we can find all types of biomes except Tundra biome.

Tundra: Tundra is a snow-covered region that lacks trees. They are located in the Polar Regions with temperatures ranging from 3°C to less than -34°C and have very less rainfall occasionally. Vegetation consists of mainly low shrubs, herbs, mosses, etc. Due to sparse vegetation, the animal biodiversity is very less with only animals that have adapted to cold regions can survive.

Statement 4 is correct: The knowledge about biomes will help us understand the requirements of each species and to take effective steps for their conservation.

52. Consider the following statements about the distribution of water on the Earth

1. Atmosphere
2. Lakes
3. Ground water
4. Glaciers

Arrange the above statements in chronological order?

- (a) 1-2-3-4
- (b) 2-1-3-4
- (c) 1-3-2-4
- (d) 3-1-2-4

Answer: a (1-2-3-4)

Explanation: The total volume of water on Earth is estimated at 1.386 billion km³ (333 million cubic miles), with 97.5% being salt water and 2.5% being freshwater. Of the freshwater, only 0.3% is in liquid form on the surface.

Atmosphere: 0.00093%

Lakes: 0.013%

Ground Water: 1.69%

Glaciers: 1.74%

Source of water	Volume of water in km ³ (cu mi)	% total water	% salt water	% fresh water	% liquid surface fresh water
Oceans	1,338,000,000 (321,000,000)	96.5	99.0		
Pacific Ocean	669,880,000 (160,710,000)	48.3	49.6		
Atlantic Ocean	310,410,900 (74,471,500)	22.4	23.0		
Indian Ocean	284,000,000 (68,000,000)	19.0	19.5		
Southern Ocean	71,800,000 (17,200,000)	5.18	5.31		
Ice and snow	24,384,000 (5,845,000)	1.76		89.8	
Glaciers	24,084,000 (5,773,000)	1.74		88.7	
Groundwater	23,400,000 (5,600,000)	1.69			
Antarctic ice sheet	21,600,000 (5,200,000)	1.56		81.7	
Arctic Ocean	18,750,000 (4,500,000)	1.35	1.39		
Saline groundwater	12,870,000 (3,090,000)	0.93	0.95		
Fresh groundwater	10,530,000 (2,530,000)	0.76		30.1	
Greenland ice sheet	2,340,000 (560,000)	0.17		6.68	
Ground ice and permafrost	300,000 (72,000)	0.022		0.86	
Lakes	176,400 (42,300)	0.013			
Fresh water lakes	91,000 (22,000)	0.0066		0.26	87.0
Saline lakes	85,400 (20,500)	0.0062	0.0063		
Arctic islands	83,500 (20,000)	0.006		0.24	
Caspian Sea	78,200 (18,800)	0.0056	0.0058		
Mountain ranges	40,800 (9,700)	0.003		0.12	
African Great Lakes	30,070 (7,210)	0.0022		0.086	28.8
Lake Baikal	23,815 (5,688)	0.0017		0.067	22.6
North American Great Lakes	22,115 (5,308)	0.0016		0.063	21.1
Soil moisture	16,500 (4,000)	0.0012		0.047	
Other fresh water lakes	15,200 (3,600)	0.0011		0.043	14.5
Atmosphere	12,900 (3,100)	0.00093		0.037	
Swamps	11,470 (2,750)	0.00083		0.033	11.0
Other saline lakes	7,200 (1,700)	0.00052	0.00053		
Rivers	2,120 (510)	0.00015		0.0061	2.03

53. Consider the following statements about aquatic species



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1. Nektons are the organisms that were carried along by the currents
2. Planktons are the active swimmer in a water body
3. Benthos are the organism that live on the bottom of the water body like sea, lake etc
4. Neustons are the species that live at the surface of a water body

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Nekton or necton refers to the actively swimming aquatic organisms in a body of water.

Statement 2 is incorrect: Planktons are the passive swimmers that were carried along with the currents

Statement 3 is correct: Benthos, also known as benthon, is the community of organisms that live on, in, or near the bottom of a sea, river, lake, or stream, also known as the benthic zone.

Statement 4 is correct: Neuston, also called pleuston, are organisms that live at the surface of a body of water, such as an ocean, estuary, lake, river, or pond. Neuston can live on top of the water surface or may be attached to the underside of the water surface

54. Consider the following statements about the PARIVESH scheme/portal

1. It is being initiated by Ministry of Environment, Forest and Climate Change in association with Ministry of Tribal Affairs
2. It is a work flow based single-in facility for all types of clearances including Coastal Regulation Zones
3. This system will provide compliance reports of the projects and environmental impact assessment reports
4. It will improve the transparency and accountability in environmental governance in India

How many of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is incorrect: The Pro-Active and Responsive and Facilitation by Interactive, Virtuous and Environmental Single Window (PARIVESH) Scheme has been initiated by the Ministry of Environment, Forest, and Climate Change (no association with any other ministry). Technical support is being provided by National Informatics Centre (NIC). It can be used for seeking clearances from all three, Central, State and district level authorities.

Statement 2 is correct: It is a web based, role based workflow application. It has been developed for the online submission and monitoring of the proposals submitted by the proponents for seeking Environment, Forest, Wildlife and Coastal Regulation Zone Clearances. It can be used for seeking clearances from all three, Central, State and district level authorities.

Statement 3 is correct: This system includes monitoring of compliance reports including geo-tagged images of the site by regulatory bodies or inspecting officers. Mobile App can also be used for enhanced compliance monitoring. It also provides access to previous Environment Impact Assessment Reports.

Statement 4 is correct: This portal will help in streamlining the approval process thereby promotes the transparency and accountability in environmental clearance projects

55. Consider the following statements about the Aquatic Ecosystems

1. Lentic and Lotic ecosystems are part of Marine Aquatic Ecosystem
2. Marine ecosystems are more diversified than terrestrial ecosystems
3. Lotic ecosystem are stagnant water bodies such as ponds, lakes, pools etc
4. Lentic ecosystem are flowing water bodies such as rivers and streams

How many of the above statements are correct?



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- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Statement 1 is incorrect: Freshwater Aquatic Ecosystems: They cover only a small portion of earth nearly 0.8 per cent. Freshwater involves lakes, ponds, rivers and streams, wetlands, swamp, bog and temporary pools. Freshwater habitats are classified into lotic and lentic habitats. Water bodies such as lakes, ponds, pools, bogs, and other reservoirs are standing water and known as lentic habitats. Whereas lotic habitats represent flowing water bodies such as rivers, streams.

Statement 2 is correct: Marine ecosystems are found in a body of water whereas terrestrial ecosystems are ecosystems that are found only on landforms. Generally, the marine ecosystems are biologically more diversified than their equivalent terrestrial ecosystems. This is explained by various plausible hypotheses including the productivity hypothesis, the water availability hypothesis, the predation risk hypothesis, the competition hypothesis, and the human factor hypothesis

Statement 3 is incorrect: They mainly refer to the rapidly flowing waters that move in a unidirectional way including the rivers and streams. These environments harbor numerous species of insects such as beetles, mayflies, stoneflies and several species of fishes including trout, eel, minnow, etc. Apart from these aquatic species, these ecosystems also include various mammals such as beavers, river dolphins and otters.

Statement 4 is incorrect: They include all standing water habitats. Lakes and ponds are the main examples of Lentic Ecosystem. The word lentic mainly refers to stationary or relatively still water. These ecosystems are home to algae, crabs, shrimps, amphibians such as frogs and salamanders, for both rooted and floating-leaved plants and reptiles including alligators and other water snakes are also found here.

56. Consider the following statements

1. High amount of Biochemical Oxygen Demand (BOD) in a water body severely limits the aquatic life
2. Chemical Oxygen Demand (COD) means the amount of oxygen is required to oxidise the organic matter present in a water body
3. The permissible limits of BOD in a water body is 30 mg/l

Which of the statements given above is/are correct?

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

Answer: d (1, 2 and 3)

Statement 1 is correct: Biochemical Oxygen Demand (BOD) is the amount of oxygen required by the bacteria and other organisms while decomposing organic matter under aerobic conditions at a specific temperatures. High amount of BOD in a water body represents the high presence of organic matter, which severely restricts the aquatic life.

Statement 2 is correct: Chemical oxygen demand, or COD, is the measure of the capacity of water to consume oxygen during the decomposition of organic matter in the water. In other words, it's the amount of oxygen that's needed to oxidise the organic matter present in a quantity of water.

Statement 3 is correct: Permissible limits of BOD: The permissible limit of BOD is 30 mg/L. COD: The permissible limit of COD is 250 to 500 ppm

57. Consider the following statements

Statement I: The average concentration of dissolved oxygen in freshwater is 150 times lower than that in an equivalent volume of air

Statement II: Oxygen enters the aquatic ecosystem via air-water contact and aquatic plants photosynthesis activities only

Which one of the following is correct in respect of the above statements?

- (a) Both statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I



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- (b) Both Statement-I and Statement-II are correct and Statement-II is not the correct explanation for Statement-I
- (c) Statement-I is correct but Statement-II is incorrect
- (d) Statement-I is incorrect but Statement-II is correct

Answer: a (Both statement-I and Statement-II are correct and Statement-II is the correct explanation for Statement-I)

Statement I is correct: The average concentration of dissolved oxygen in freshwater is 0.0010 percent by weight (also known as 10 parts per million or 10 ppm), which is 150 times lower than the oxygen concentration in an equivalent volume of air. When there is a downfall in this amount of dissolved oxygen the organisms cannot survive

Statement II is correct: Oxygen enters the aquatic ecosystem via the air-water contact and aquatic plants' photosynthetic activity. The temperature has an effect on the amount of dissolved oxygen retained in the water. Warm water makes oxygen less soluble. Decomposer activity is also boosted by warm water. As a result, raising the temperature of a water body accelerates the depletion of oxygen in the water.

58. Consider the following statements

1. Food chain is always ends with decomposers
2. Autotrophs produce their food through photosynthesis process
3. Energy always flow from higher tropic level to lower tropic level
4. Human beings are always fit at the fourth tropic level

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Decomposers are organisms that get energy from dead or waste organic material. This is the last stage in a food chain. Decomposers are an integral part of a food chain, as they convert organic waste materials into inorganic materials, which enriches the soil or land with nutrients.

Statement 2 is correct: The producers utilise the energy from the sun to make food. Producers are also known as Autotrophs as they make their own food. Producers are any plant or other organisms that produce their own nutrients through photosynthesis.

Statement 3 is incorrect: Energy flows through the trophic levels from producers to subsequent trophic levels. This energy always flows lower (producer) to higher (herbivore, carnivore etc.) trophic level. It never flows in the reverse direction that is from carnivores to herbivores to producers.

Statement 4 is incorrect: Many humans are omnivores, meaning they consume both plant and animal material. Thus, they may be on the third or even fourth trophic level.

59. Which of the following is part of 'Gaseous Nutrient Cycle'?

1. Water cycle
2. Phosphorus cycle
3. Sulphur cycle
4. Nitrogen cycle

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Explanation: Gaseous Cycles are the cycles where the reservoir is the atmosphere or the hydrosphere. Gaseous cycles include water cycle, carbon cycle and nitrogen cycle etc.

Sedimentary Cycles are the cycles where the reservoir is the earth's crust. Sedimentary cycles include Phosphorus cycle, Calcium Cycle and Magnesium Cycle and Sulphur cycle etc

60. Consider the following statements about the Coral Reefs

1. They are formed by coral polyps, held together by calcium carbonate
2. They can be found only in tropical and subtropical water bodies
3. They are highly adaptable organisms that can withstand harsh conditions of marine ecosystem.



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4. Gulf of Mannar has the richest coral diversity in India

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Statement 1 is correct: Coral reefs are the colonies of tiny living creatures that are found in oceans. They are the underwater structures that are formed of coral polyps that are held together by calcium carbonate. Coral reefs are also regarded as the tropical rainforest of the sea and occupy just 0.1% of the ocean's surface but are home to 25% of marine species. They are usually found in shallow areas at a depth less than 150 feet. However, some coral reefs extend even deeper, up to about 450 feet.

Statement 2 is incorrect: Coral polyps are individual corals that are found on the calcium carbonate exoskeletons of their ancestors. Corals can be found in all the oceans but the biggest coral reefs are mostly found in the clear, shallow waters of the tropics and subtropics. The largest of these coral reef systems, the Great Barrier Reef in Australia is more than 1,500 miles long.

Statement 3 is incorrect: The temperature of the water should not be below 20°C. The most favourable temperature for the growth of the coral reefs is between 23°C to 25°C. The temperature should not exceed 35°C. Corals can survive only under saline conditions with an average salinity between 27% to 40%.

Statement 4 is incorrect: Andaman and Nicobar Islands are the richest of the Indian region in coral diversity with as many as 179 species belonging to 61 genera. The common genera contributing to the reef formation are Acropora, Montipora, Pocillopora, Porites, Goniopora, Favia, Fungia, Millepora, Soft Coral (Sarcophyton)

61. Consider the following statements about Mangrove forests

- 1. They have breathing roots known as pneumatophores.

2. They are found only in tropical and subtropical regions of the world

3. They require high solar radiation and absorb fresh water from saline water

4. Mangrove forests have viviparity mode of reproduction

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: Mangrove species have specialized above ground roots called breathing roots or pneumatophores. In some species, these roots are pencil sized and peg like whereas in some other species they look like a knee. These roots have numerous pores through which oxygen enters into the underground tissues.

Statement 2 is correct: Since these mangrove forest requires high solar radiation they can't survive in polar regions. Hence they are limited to tropical and sub-tropical regions of the world.

Statement 3 is correct: The mangrove trees require high solar radiation and have the ability to absorb fresh water from saline/brackish water.

Statement 4 is correct: Mangrove forest have Viviparity mode of reproduction meaning tree seeds germinate within the tree before falling. This is an adaptive method for overcoming the saline water germination challenge

62. Consider the following statements about the biodiversity

- 1. Genetic diversity is the variation in genes within particular species
- 2. Species diversity is the variety of species in an ecosystem influenced by nature of the ecosystem
- 3. Community diversity is the variety of living organisms on the earth

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) None



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Answer: a (Only one)

Statement 1 is correct: Genetic Diversity: It is concerned with the variation in genes within a particular species. It is the total number of genetic characteristics in the genetic makeup of a species. Genetic diversity allows species to adapt to changing environments. This diversity aims to ensure that some species survive drastic changes and thus carry on desirable genes. The survival of individuals ensures the survival of the population. The genetic diversity gives us beautiful butterflies, roses, parakeets or coral in myriad hues, shapes and sizes.

Statement 2 is incorrect: Species Diversity: It refers to the variety of living organisms on Earth. Species differ from one another, markedly in their genetic makeup, do not interbreed in nature. Closely related species, however, have in common much of their hereditary characteristics. For instance, about 98.4 % of the genes of humans and chimpanzees are same. It is the ratio of one species population over the total number of organisms across all species in the given biome. 'Zero' would be infinite diversity, and 'one' represents only one species present.

Statement 3 is incorrect: Community Diversity: This refers to different types of habitats. A habitat is the cumulative factor of the climate, vegetation and geography of a region. There are several kinds of habitats around the world. Corals, grasslands, wetland, desert, mangrove and tropical rainforests are examples of the ecosystem. Change in climatic conditions is accompanied by a change in vegetation as well. Each species adapts itself to a particular kind of environment. As the environment changes, species best adapted to that environment becomes predominant. Thus, the variety or diversity of species in the ecosystem is influenced by the nature of the ecosystem.

63. Consider the following statements about the Nitrogen cycle

1. Atmospheric Nitrogen is made available to plants by symbiotic bacteria
2. In Nitrogen fixation process atmospheric Nitrogen is converted into Ammonia
3. Ammonia is converted into Nitrites through oxidation process

4. Nitrites and Nitrates are released into the soil through this cycle which are very important for Agriculture

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: Inorganic (contains no Hydrogen bonds) forms of nitrogen are found in abundance in the atmosphere. This nitrogen is made available to plants by symbiotic bacteria which can convert the inert nitrogen into a usable form – such as nitrites and nitrates.

Statement 2 is correct: Process of the Nitrogen Cycle consists of the following steps – Nitrogen fixation, Nitrification, Assimilation, Ammonification and Denitrification. It is the initial step of the nitrogen cycle. Here, Atmospheric nitrogen (N_2) which is primarily available in an inert form, is converted into the usable form -ammonia (NH_3). During the process of Nitrogen fixation, the inert form of nitrogen gas is deposited into soils from the atmosphere and surface waters, mainly through precipitation.

Statement 3 is correct: Nitrification step: In this process, the ammonia is converted into nitrate by the presence of bacteria in the soil. Nitrites are formed by the oxidation of ammonia with the help of *Nitrosomonas* bacteria species. Later, the produced nitrites are converted into nitrates by *Nitrobacter*. This conversion is very important as ammonia gas is toxic for plants.

Statement 4 is correct: Nitrates and nitrites are released into the soil, which helps in enriching the soil with the necessary nutrients required for cultivation

64. Consider the following statements about the Carbon Cycle

1. Planet Earth is called closed system as it receives a very few carbon atoms from the space
2. Plants store the carbon dioxide in roots, grasslands and forests
3. Carbon is released into atmosphere through photosynthesis and respiration



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4. Perturbation of carbon cycle is leading causing for global warming

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: Planet Earth is called a closed system because it does not exchange mass with the space, but only energy. This means that the amount of matter on Earth remains constant, but the form and location of the matter can change due to various processes. For example, the carbon cycle describes how carbon atoms move between the atmosphere, the biosphere, the geosphere, and the hydrosphere. However, Earth is not a perfectly closed system, as it receives a very small amount of matter from the space, such as meteorites, dust, and cosmic rays. These are mostly composed of carbon atoms, as well as other elements. The amount of carbon atoms that Earth receives from the space is estimated to be about 40,000 metric tons per year². This is very negligible compared to the total mass of carbon on Earth, which is about 1.85×10^{18} metric tons. Therefore, Earth is considered a closed system for most practical purposes.

Statement 2 is correct: Plants constantly exchange carbon with the atmosphere. Plants absorb carbon dioxide during photosynthesis and much of this carbon dioxide is then stored in roots, permafrost, grasslands, and forests. Plants and the soil then release carbon dioxide when they decay.

Statement 3 is incorrect: Carbon is released into the atmosphere through respiration, decay of organic matter and volcanic action but not with photosynthesis process. With this process carbon dioxide is used by plants to produce their energy

Statement 4 is correct: The carbon cycle undergoes perturbations caused by a variety of natural processes such as wildfires, droughts, insect infestations, and disease. This is a leading cause for global warming.

65. Consider the following statements about Niche of an organism

1. It describes the role of an organism plays in a community
2. It encompasses interactions only with other species that shares a common habitat
3. No two species can have exactly the same Niche
4. Species that have limited Niche are considered to be keystone species

How many of the above statements are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: In ecology, the term “niche” describes the role an organism plays in a community.

Statement 2 is incorrect: A species’ niche encompasses both the physical and environmental conditions it requires (like temperature or terrain) and the interactions it has with other species (like predation or competition).

Statement 3 is correct: No two species can have the exact same niche, otherwise they would be in direct competition for resources with one another. If this occurs, then one species will outcompete the other. Thus, it would lead to extinction of weaker species.

Statement 4 is incorrect: In general, species that have narrow or limited niches are considered to be specialist species. Koalas (*Phascolarctos cinereus*), which feed only on leaves from eucalyptus trees in Australia, are an example of a specialist species.

66. Consider the following statements about the Energy sector in India

1. Around 96% of coal used by Thermal Power Plants is coming from domestic sources
2. Coal deposits in India contains high levels of ash compared to other major suppliers
3. High sulphur content in coal can reduce the global temperature rise by blocking incoming solar radiations
4. Use of Flue Gas Desulphurisers in thermal power plants can increase the global average temperatures

How many of the statements given above are correct?



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- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: Ninety-six percent of the coal used by TPPs in India comes from domestic mines and it is key to why electricity is so affordable in India. Therefore, the CEA's National Electricity Plan projects that TPP capacity in India will reach 259-262 GW by FY32, from 212 GW in FY23.

Statement 2 is correct: Coal deposits in India generally contain high levels of ash (35-50%) compared to those mined in other major coal-mining countries, like Australia, China, and the U.S. Burning coal with more ash leads to the erosion and eventual failure of boiler tubes and other components, affecting the plant's availability, efficiency, and performance.

Statement 3 is correct: According to the U.N. Intergovernmental Panel on Climate Change, historical sulphur dioxide emissions have created a cooling effect by producing sulphate aerosols that block some of the incoming solar radiation and enhance cloud formation, masking global temperature rise by 0.5 degrees Celsius.

Statement 4 is correct: The projected reduction in the gas's emission in China by the use of flue gas desulphurisers (FGDs) in their TPPs could result in an increase in the global average temperature between 2016 and 2050 by about 0.6 degrees Celsius.

67. Which of the following organisation decides the power (electricity) tariffs in India?

- (a) Central Electricity Authority
- (b) Central Electricity Regulatory Commission
- (c) Ministry of Power
- (d) Solar Energy Corporation of India

Answer: b (Central Electricity Regulatory Commission)

Explanation: Electricity tariff is determined based on the provisions contained in (a) Electricity Act 2003 and (b) Tariff Policy notified by the Government of India. In case of central generating stations and where two or more states are involved, the Central

Electricity Regulatory Commission determines the tariff.

Central Electricity Authority: Under the Electricity Act 2003, CEA prescribes the standards on matters such as construction of electrical plants, electric lines and connectivity to the grid, installation and operation of meters and safety and grid standards. The CEA is also responsible for coordination of hydro power development schemes of central, state and private sectors taking into consideration the factors which will result in efficient development of the river and its tributaries for power generation, consistent with the requirement of drinking water, irrigation, navigation and flood control.

68. Consider the following statements about SATHEE (Self-Assessment Test and Help for Entrance Exams)

1. It is an initiative of Ministry of Education to provide free coaching to students for competitive exams
2. It is based on Artificial intelligence programme called Prutor developed by IIT-Kanpur

Which of the statements given above is/are correct?

- (a) Only one
- (b) Only two
- (c) Both 1 and 2
- (d) Neither 1 nor 2

Answer: c (Both 1 and 2)

Statement 1 is correct: It is a new initiative by the Ministry of Education to provide a free learning and assessment platform for students. It will help students gain access to training and coaching for competitive examinations for free. The platform aims to bridge the gap for students in society who are not able to afford the costly entrance exam guidance and coaching. It will have preparation materials for students in English, Hindi, and other regional languages of India so that students can prepare for exams like JEE and NEET.

Statement 2 is correct: It makes use of an indigenously developed AI programme called Prutor, which was developed by IIT-Kanpur.



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69. Which of the following particles are used in cloud seeding process?

- (a) Silver Iodide
- (b) Hydrogen Iodide
- (c) Potassium Iodide
- (d) Sodium Iodide

Answer: a (Silver Iodide)

Explanation: Cloud seeding is a weather modification technique that improves a cloud's ability to produce rain or snow by introducing tiny ice nuclei into certain types of subfreezing clouds. These nuclei provide a base for snowflakes to form. After cloud seeding takes place, the newly formed snowflakes quickly grow and fall from the clouds back to the surface of the Earth, increasing snowpack and stream flow.

Most cloud seeding operations, including those run by DRI, use a compound called silver iodide (AgI) to aid in the formation of ice crystals. Silver iodide exists naturally in the environment at low concentrations, and is not known to be harmful to humans or wildlife.

70. Consider the following statements about the Forest Rights Act: 2006

1. Traditional Forest dwellers have the right to collect, use and dispose of minor forest produce
2. Ministry of Tribal Affairs is the nodal agency to implement this act
3. Gram Sabha has the sole authority to initiate the process for determining the forest rights
4. State government has the power to make rules within its jurisdiction

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: Section 3 (c): Right of ownership, access to collect, use, and dispose of minor forest produce which has been traditionally collected within or outside village boundaries;

Statement 2 is correct: Section 11: Nodal agency.– The Ministry of the Central Government dealing with

Tribal Affairs or any officer or authority authorised by the Central Government in this behalf shall be the nodal agency for the implementation of the provisions of this Act

Statement 3 is correct: Section 6: Authorities to vest forest rights in forest dwelling Scheduled Tribes and other traditional forest dwellers and procedure thereof.–(1) The Gram Sabha shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both that may be given to the forest dwelling Scheduled Tribes and other traditional forest dwellers within the local limits of its jurisdiction under this Act by receiving claims, consolidating and verifying them and preparing a map delineating the area of each recommended claim in such manner as may be prescribed for exercise of such 7 rights and the Gram Sabha shall, then, pass a resolution to that effect and thereafter forward a copy of the same to the Sub-Divisional Level Committee.

Statement 4 is incorrect: Section 14: Power to make rules. –(1) The Central Government may, by notification, and subject to the condition of previous publication, make rules for carrying out the provisions of this Act.

71. Consider the following statements about the Operation SMILE or Operation MUSKAAN

1. Initially it was started in 2014 by the UP Police
2. The main objective of this mission is to locate missing children listed in FIRs
3. This operation being implemented by Ministry of Women and Child Development

Which of the statements given above are correct?

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

Answer: a (1 and 2 only)

Statement 1 is correct: In September 2014, the Ghaziabad Police Department in Uttar Pradesh launched this operation, which resulted in the rescue of 227 children in a month. This successful operation prompted the Central Ministry to train state police units and implement Operation Muskaan.



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Statement 2 is correct: Objective of this programme is to locate and rehabilitate missing children. It is a month-long campaign in which State Police employees engage in various actions to identify and rescue missing children, and reconnect them with their families.

Statement 3 is incorrect: It is an initiative of Ministry of Home Affairs based on the success story of UP police

72. Which of the following states have enacted laws for reservation of up to 75% to locals in private employment

1. Haryana
2. Tamil Nadu
3. Andhra Pradesh
4. Odisha

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Explanation: Apart from Haryana, Other States such as Maharashtra (up to 80%), Karnataka (up to 75%), Andhra Pradesh (up to 75%) and Madhya Pradesh (up to 70%) have also enacted similar laws providing reservations for their local residents in the private sector. In November 2019, the Andhra Pradesh Assembly passed The Andhra Pradesh Employment of Local Candidates in the Industries/Factories Bill, 2019, reserving three-fourths of jobs for local candidates within three years of the commencement of the Act.

73. Consider the following statements about the Special Category Status (SCS) to a state

1. SCS is granted by the National Development Council based on the recommendations of Gadgil committee recommendations
2. One of the criteria is low population density or sizeable share of tribal population
3. Social, economic and infrastructure background

4. States with SCS are exempted from customs duty, corporate tax, income tax and other taxes to attract investments

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: The concept of a special category status was first introduced in 1969 when the fifth Finance Commission sought to provide certain disadvantaged states with preferential treatment in the form of central assistance and tax breaks, establishing special development boards, reservation in local government jobs, educational institutions, etc. This formula was named after the then Deputy Chairman of the Planning Commission, Dr Gadgil Mukherjee and is related to the transfer of assistance to the states by centre under various schemes.

The special category status is granted by the National Development Council, which is an administrative body of the government.

Statement 2 is correct: Criteria for special category status:

- Hilly and difficult terrain
- Low population density or sizeable share of tribal population
- Strategic location along borders with neighbouring countries
- Economic and infrastructural backwardness
- Non-viable nature of state finances

Statement 3 is incorrect: The criteria does not mention about the social backwardness but it mentioned about the Economic and infrastructure background

Statement 4 is correct: Benefits states confer with special category status:

States which are granted special category status enjoy several benefits.

- The central government bears 90 percent of the state expenditure on all centrally-sponsored schemes and external aid while rest 10 percent is given as loan to state at zero percent rate of interest.



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- Preferential treatment in getting central funds.
- Concession on excise duty to attract industries to the state.
- 30 percent of the Centre's gross budget also goes to special category states.
- These states can avail the benefit of debt-swapping and debt relief schemes.
- States with special category status are exempted from customs duty, corporate tax, income tax and other taxes to attract investment.
- Special category states have the facility that if they have unspent money in a financial year; it does not lapse and gets carry forward for the next financial year.

74. Consider the following statements about the National Integration Council

1. It is a constitutional body
2. It is created to address the problems of communism, casteism and regionalism
3. It contains the Prime Minister as chairman and cabinet ministers and chief ministers of all states and administrators of union territories
4. It is proposed to be abolished but no resolution has been passed till now

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: a (Only one)

Statement 1 is incorrect: The National Integration Council originated in a conference convened by Prime Minister Jawaharlal Nehru in September–October 1961. The purpose was to find ways to counter problems that were dividing the country including attachment to specific communities, castes, religions and languages.

The conference set up the NIC to review national integration issues and make recommendations. The NIC met for the first time in June 1962

Statement 2 is correct: The National Integration Council (NIC) is a group of senior politicians and public figures in India that looks for ways to address

the problems of communalism, casteism and regionalism. Council members include cabinet ministers, entrepreneurs, celebrities, media heads, chief ministers, and opposition leaders.

Statement 3 is incorrect: The Council members include cabinet ministers, entrepreneurs, celebrities, media heads, chief ministers, and opposition leaders. It does not include administrators of Union territories.

Statement 4 is incorrect: It is not proposed to be abolished. However the National Development Council was proposed to be abolished but no resolution was adopted to abolish it.

75. 'Digital Twin' recently seen in news means?

- (a) A digital copy that depicts the real world entity
- (b) A Artificial Intelligence (AI) technology to create copy of real world entities
- (c) A facial recognition technology
- (d) A chatbot, recently developed by Google

Answer: a (A digital copy that depicts the real world entity)

Explanation: A digital twin is a virtual depiction of real world entity be it a product, process, person or location, capable of comprehending and gauging its tangible counterparts. The twin digital copy will also help policy makers understand how infrastructure will function in different situations like high foot print events, increase of population or during natural disasters.

76. Consider the following statements about the Global Methane Pledge (GMP)

1. It is an initiative launched during the COP28 in Dubai
2. The goal is to reduce the Methane emissions by at-least 30% from 2020 levels by 2030
3. India is one of the founding member of this initiative
4. The Climate and Clean Air Coalition provides secretariat services to GMP

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four



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Answer: b (Only two)

Statement 1 is incorrect: Methane is a powerful but short-lived climate pollutant that accounts for a third of net warming since the Industrial Revolution. Rapidly reducing methane emissions from energy, agriculture, and waste can achieve near-term gains in our efforts in this decade for decisive action and is regarded as the single most effective strategy to keep the goal of limiting warming to 1.5°C within reach while yielding co-benefits, including improving public health and agricultural productivity. The Global Methane Pledge (GMP) was launched at COP26 by the European Union and the United States.

Statement 2 is correct: Participants joining the Pledge agree to take voluntary actions to contribute to a collective effort to reduce global methane emissions at least 30 percent from 2020 levels by 2030. This is a global, not a national reduction target.

Statement 3 is incorrect: Over 150 countries became a part of this initiative except the largest contributors such as India, China and Russia

Statement 4 is correct: Climate and Clean Air Collision provides secretarial services to GMP

77. Migration and Economic Development Partnership (MEDP) recently seen in new is an agreement between which of the following countries?

- (a) India-Myanmar
- (b) UK-EU
- (c) UK-Rwanda
- (d) UK-Uganda

Answer: c (UK-Rwanda)

Explanation: The Migration and Economic Development Partnership (MEDP) was announced in April 2022 by former Prime Minister Boris Johnson. The objective of the deal is to “create a mechanism” for the transfer of asylum seekers not considered by the UK into Rwanda. The inadmissibility clause of the UK’s asylum system plays a key role in categorising people who enter the U.K. through “irregular journeys” such as the English Channel. According to the Memorandum of Understanding between the two nations, the U.K. will screen asylum seeker applications and arrange for safe transport to Rwanda. On arrival of the refugees, Rwanda is obliged to provide accommodation for every

individual and protect them from ill-treatment and refoulement. Rwanda will be the sole authority to recognise or not recognise the refugee status of an individual. If an individual is not recognised, they will be moved to their country of origin.

78. Consider the following statements about the United Nations High Commissioner for Refugees (UNHCR)

1. It was created in 1950 to address the refugee crisis in Europe that resulted from World War II.
2. The main objective is to protect and assist in their voluntary repatriation or local integration
3. The scope of UNHCR is widened to include all refugees all over the world through 1967 protocol
4. India is one of the key signatory to the convention and to its additional protocol

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: UNHCR was created in 1950 to address the refugee crisis that resulted from World War II. The 1951 Refugee Convention established the scope and legal framework of the agency's work, which initially focused on Europeans uprooted by the war.

Statement 2 is correct: The United Nations High Commissioner for Refugees (UNHCR) is a United Nations agency mandated to aid and protect refugees, forcibly displaced communities, and stateless people, and to assist in their voluntary repatriation, local integration or resettlement to a third country. It is headquartered in Geneva, Switzerland, with over 18,879 staff working in 138 countries as of 2020.

Statement 3 is correct: Beginning in the late 1950s, displacement caused by other conflicts, from the Hungarian Uprising to the decolonization of Africa and Asia, broadened the scope of UNHCR's operations. Commensurate with the 1967 Protocol to the Refugee Convention, which expanded the



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geographic and temporal scope of refugee assistance, UNHCR operated across the world, with the bulk of its activities in developing countries.

Statement 4 is incorrect: India is not a party to the 1951 Refugee Convention and its 1967 Protocol, the key legal documents pertaining to refugee protection. However, India has had a stellar record on the issue of refugee protection. India has a moral tradition for assimilating foreign people and culture.

Note: UNHCR had received 2 Nobel Peace Prizes in 1954 and 1981

79. What is the term ‘Hypoxia’ means?

- (a) Oxygen is not available in sufficient amounts at the tissue level to maintain adequate homeostasis
- (b) Oxygen is heavily used by body at tissue level to sustain normal body functions
- (c) Oxygen is not available to perform normal body functions
- (d) Excess Oxygen is required to perform normal body functions

Answer: a (Oxygen is not available in sufficient amounts at the tissue level to maintain adequate homeostasis)

Explanation: Hypoxia is a state in which oxygen is not available in sufficient amounts at the tissue level to maintain adequate homeostasis; this can result from inadequate oxygen delivery to the tissues either due to low blood supply or low oxygen content in the blood (hypoxemia).

Homeostasis: A state of balance among all the body systems needed for the body to survive and function correctly.

80. Consider the following statements about the Pradhana Mantri Garid Kalyan Anna Yojana (PM-GKAY)

- 1. It is being implemented by Ministry of Consumer Affairs, Food and Public Distribution
- 2. Households covered under Antyodaya Anna Yojana and priority households covered under National Food Security Act are eligible for entitlements under PM-GKAY

3. Under the National Food Security Act, food security allowances are provided in case non-supply of entitlements

4. Every children from all income groups under the age group below 14 years shall be entitled to nutritional support under National Food Security Act: 2013

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Statement 1 is correct: PMGKAY is a food security welfare scheme announced by the GoI in March 2020, during the COVID-19 pandemic in India. The program is operated by the Department of Food and Public Distribution under the Ministry of Consumer Affairs, Food and Public Distribution. The scale of this welfare scheme makes it the largest food security program in the world.

Statement 2 is correct: To feed the poorest citizens of India by providing grain through the Public Distribution System to all the priority households will be identified by the state government from under section 10 of National Food Security Act: 2013

(a) the households to be covered under the Antyodaya Anna Yojana to the extent specified under sub-section (1) of section 3, in accordance with the guidelines applicable to the said scheme; (b) the remaining households as priority households to be covered under the Targeted Public Distribution System, in accordance with such guidelines as the State Government may specify

Statement 3 is correct: Under section 8 of NFSA 2013: Right to receive food security allowance in certain cases.— In case of non-supply of the entitled quantities of foodgrains or meals to entitled persons under Chapter II, such persons shall be entitled to receive such food security allowance from the concerned State Government to be paid to each person, within such time and manner as may be prescribed by the Central Government.

Statement 4 is correct: Under Section 5 of NFSA. **Nutritional support to children.**—



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(1) Subject to the provisions contained in clause (b), every child up to the age of fourteen years shall have the following entitlements for his nutritional needs, namely:— (a) in the case of children in the age group of six months to six years, age appropriate meal, free of charge, through the local anganwadi so as to meet the nutritional standards specified in Schedule II: Provided that for children below the age of six months, exclusive breast feeding shall be promoted; (b) in the case of children, up to class VIII or within the age group of six to fourteen years, whichever is applicable, one mid-day meal, free of charge, everyday, except on school holidays, in all schools run by local bodies, Government and Government aided schools, so as to meet the nutritional standards specified in Schedule II.

(2) Every school, referred to in clause (b) of subsection (1), and anganwadi shall have facilities for cooking meals, drinking water and sanitation: Provided that in urban areas facilities of centralised kitchens for cooking meals may be used, wherever required, as per the guidelines issued by the Central Government.

81. 'The State of inequality in India' report is released by

- (a) Oxfam
- (b) United Nations Development Programme
- (c) Niti Aayog
- (d) Economic Advisory Council to the Prime Minister

Answer: d (Economic Advisory Council to the Prime Minister)

Explanation: The State of Inequality in India Report was released today by Dr Bibek Debroy, Chairman, Economic Advisory Council to the Prime Minister (EAC-PM). The report has been written by the Institute for Competitiveness and presents a holistic analysis of the depth and nature of inequality in India. The report compiles information on inequities across sectors of health, education, household characteristics and the labour market. As the report presents, inequities in these sectors make the population more vulnerable and triggers a descent into multidimensional poverty.

82. What is meant by Global Carbon Budget?

- (a) Maximum cumulative CO2 emissions that will result in limiting global warming to a given level
- (b) Maximum cumulative CO2 emissions that are emitted from all sources of greenhouse gasses
- (c) Total amount of CO2 emissions done by the global community in a year
- (d) Total amount of CO2 emissions available to reach net zero emissions by global community

Answer: a (Maximum cumulative CO2 emissions that will result in limiting global warming to a given level)

Explanation: The term 'global carbon budget' refers to the maximum cumulative global anthropogenic CO₂ emissions – from the pre-industrial era to when such emissions reach net- zero, resulting in limiting global warming to a given level with a given probability. The remaining carbon budget indicates how much CO₂ could still be emitted, from a specified time after the pre-industrial period, while keeping temperature rise to the specified limit.

83. Consider the following pairs about the major decisions taken during the Conference of Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC)

Conference	Decisions
COP 3: Kyoto: Japan	Legally binding agreements to reduce green house gas emissions by Annex 1 countries
COP 6: Bonn, Germany	Clean Development Mechanism and creation of carbon sinks
COP 8: New Delhi: India	Agreement on Technology transfer by developed countries
COP15: Copenhagen: Denmark	Developed countries promised to fund \$100 billion a year by 2020

How many pairs given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Pair 1 is correctly matched: COP 3 took place on 1–11 December 1997 in Kyoto, Japan. After intensive negotiations, it adopted the Kyoto Protocol, which



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outlined the greenhouse gas emissions reduction obligation for Annex I countries, along with what came to be known as Kyoto mechanisms such as emissions trading, clean development mechanism and joint implementation.

Pair 2 is correctly matched: COP 6: Bonn: Germany: Major decision taken during this summit includes Flexible mechanism, joint implementation, Clean Development Mechanism and creation of Carbon sinks.

Pair 3 is correctly matched: Taking place from 23 October to 1 November 2002, in New Delhi COP 8 adopted the Delhi Ministerial Declaration that, amongst others, called for efforts by developed countries to transfer technology and minimize the impact of climate change on developing countries. It is also approved the New Delhi work programme.

Pair 4 is correctly matched: Developed countries committed to provide US \$100 billion dollars a year, during the COP 15 talks in Copenhagen in 2009.

84. Which of the following countries formed the Global Biofuel Alliance?

1. USA
2. China
3. Russia
4. India

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Explanation: To strengthen global cooperation for rapid adoption and deployment of biofuels, the Global Biofuels Alliance (GBA) was launched on 9th September 2023, on the sidelines of the G20 Summit in New Delhi with the support of 19 countries and 12 international organizations.

GBA is a multi-stakeholder alliance of Governments, International Organizations and Industries, bringing together the biggest consumers and producers of biofuels and interested Countries from Global South to drive development and deployment of biofuels. The initiative aims to position biofuels as a key to energy transition. GBA intends to expedite the global

uptake of biofuels through facilitating capacity-building, providing technical support for national programs, sharing of best practices and promoting technology advancements, with the participation of a wide spectrum of stakeholders. GBA is also expected to act as a central repository of knowledge and an expert hub.

The GBA welcomes other countries to join by endorsing the foundation document, fostering an inclusive approach to sustainable energy solutions. Unlike exclusive alliances, the GBA's membership is open to both G20 and non-G20 countries, mirroring the inclusive nature of the International Solar Alliance. Thus far, 19 countries have expressed their interest in joining, signalling a global consensus on the importance of sustainable biofuels. This list includes countries like Italy, Kenya, and the United Arab Emirates.

Members:

Asia: India, Bangladesh, Philippines and UAE

Africa: Mauritius

Europe: Italy

South America: Argentina

North America: USA

China and oil producers Saudi Arabia and Russia have however decided not to be part of the alliance.

85. Consider the following statements about Mirabai

1. She is considered Lord Krishna as her husband
2. Her songs are found in holy ganth of Sikhs Adi Granth
3. Payoji maine Naam Ratan dhan payo is famous songs written by Mirabai
4. In Maharashtra, Bhakti movement was spread under Mirabai

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Mirabai was born into a Rathore Rajput royal family in Kudki (modern-day Pali district of Rajasthan), and spent her childhood in Merta. She is mentioned in Bhaktamal, confirming



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that she was widely known and a cherished figure in the Bhakti movement by about 1600 CE. Most legends about Mirabai mention her fearless disregard for social and family conventions, her devotion to Krishna, her treatment of Krishna as her husband, and her persecution by her in-laws for her religious devotion.

Statement 2 is incorrect: When the Adi Granth was compiled in 1604, a copy of the text was given to a Sikh named Bhai Banno who was instructed by Guru Arjan to travel to Lahore to get it bound. While doing so, he made a copy of the codex, which included compositions of Mirabai. These unauthorized additions were not included in the standardized edition of the scripture by the Sikh gurus, who rejected their inclusion.

Statement 3 is correct: One of her most popular compositions remains "Payoji maine Naam Ratan dhan payo" "I have been given the richness of God's name blessing"). Meera's poems are lyrical padas (metric verses) in the Rajasthani language. While thousands of verses are attributed to her, scholars are divided as to how many of them were actually penned by Meera herself.

Statement 4 is incorrect: In Maharashtra, the Bhakti movement gained momentum in the late 13th century, led by the Varkaris. Influential figures like Jnanadev, Namdev, and Tukaram played a pivotal role, leaving behind verses that encapsulated the essence of Bhakti. Tukaram, a Shudra by caste, rebelled against societal norms by becoming a merchant and defying Brahminical injunctions against writing on religious matters. Writing in Marathi rather than Sanskrit, Tukaram faced opposition from the orthodoxy.

86. Consider the following statements about the Micro nutrients required by plants

1. Nitrogen
2. Potassium
3. Zinc
4. Manganese

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Explanation: SHC is a printed report that a farmer will be handed over for each of his holdings. It will contain the status of his soil with respect to 12 parameters, namely N,P,K (Macro-nutrients) ; S (Secondary- nutrient) ; Zn, Fe, Cu, Mn, Bo (Micro - nutrients) ; and pH, EC, OC (Physical parameters). Based on this, the SHC will also indicate fertilizer recommendations and soil amendment required for the farm.

Second Nutrients:

Zinc (Zn): Zinc is required for the metabolism of plants, enzyme function, and ion transport. Inadequate Zn availability in soil is a main consideration for plant nutrition, resulting in a significant loss in production and grain nutrient content.

Manganese (Mn): Manganese (Mn) is an important micronutrient for plant growth and development and sustains metabolic roles within different plant cell compartments. It catalyse the water-splitting reaction during Photosynthesis process

Boron (B) B is one of the essential nutrients for the optimum growth, development, yield, and quality of crops. It mainly involved in cell wall synthesis and structural integration.

Iron (Fe): Iron is involved in the synthesis of chlorophyll, and it is essential for the maintenance of chloroplast structure and function. Iron deficiency in plants can lead to bleaching of leaf margins. Chlorophyll is a pigment that gives plants their green colour, and it helps plants create their own food through photosynthesis.

Copper (Cu): Copper is required for many enzymatic activities in plants and for chlorophyll and seed production. Deficiency of copper can lead to increased susceptibility to diseases like ergot, which can cause significant yield loss in small grains.

Molybdenum: Molybdenum is necessary for the process of symbiotic nitrogen fixation by Rhizobia bacteria in legume root modules. It transform nitrogen into amino acids thus leading to greater yields

Chlorine: Its functions in plants growth and development include osmotic and stomatal



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regulation, evolution of oxygen in photosynthesis and disease resistance and tolerance.

Major Nutrients:

Nitrogen (N): Nitrogen is so vital because it is a major component of chlorophyll, the compound by which plants use sunlight energy to produce sugars from water and carbon dioxide (i.e., photosynthesis). It's also important because nitrogen is a: Major component of amino acids, the building blocks of proteins.

Phosphorus (P): It is major constituent of plant cell involved in cell division and the development of growing tip of the plant. And it vital for seedling and young plants

Potassium (K): Potassium also helps regulate the opening and closing of the stomata, which regulates the exchange of water vapor, oxygen and carbon dioxide. If K is deficient or not supplied in adequate amounts, it stunts plant growth and reduces yield.

87. Consider the following statements about the components of Rashtriya Krishi Vikas Yojana (RKVY) Cafeteria scheme

1. Soil Health card scheme
2. Rainfed Area Development
3. Paramparagat Krishi Vikas yojana
4. Per Drop More Crop

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Explanation: As per recommendation of Expenditure Finance Committee, RKVY has re-structured as RKVY Cafeteria Scheme from 2022-23 onwards merging some schemes of Department of Agriculture & Farmers Welfare which includes Soil Health & Fertility, Rainfed Area Development, Paramparagat Krishi Vikas Yojana (PKVY), Per Drop More Crop, Agriculture Mechanization (including Promotion of Agricultural Mechanization and Management of Crop Residue (CRM), Village Haats & GRAAMS and Crop Diversification Programme.

RKVY cafeteria scheme has 3 components Annual Action Plan (AAP), Detailed Project Report (DPR) and Administration, Monitoring and Evaluation including startup. Out of the total allocation of RKVY, a minimum of 70% will be allocated for Annual Action Plan (AAP) component including Administration, Monitoring and Evaluation purposes. A maximum of 30% of total allocation of RKVY will be earmarked for Detailed Project Report (DPR) component.

88. Consider the following statements about Biotech-KISAN scheme

1. This scheme is being implemented by Department of Biotechnology, Ministry of Science and Technology
2. It is being implemented in hub-spoke model and stimulates entrepreneurship and innovation in farmers
3. It helps in empowering the women farmers with fellowship programmes

Which statements given above are correct?

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

Answer: d (1, 2 and 3)

Statement 1 is correct: Biotech-Krishi Innovation Science Application Network (Biotech-KISAN) is a Department of Biotechnology, Ministry of Science and Technology initiative that empowers farmers, especially women farmers. It aims to understand the problems of water, soil, seed and market faced by the farmers and provide simple solutions to them.

Statement 2 is correct: Biotech-Krishi Innovation Science Application Network (Biotech-KISAN) is being implemented in 15 agro-climatic zones of India in phased manner with the following objectives:

- Linking available science and technology to the farm by first understanding the problem of the local farmer and provide solutions to those problems.
- The working together, in close conjunction, of scientists and farmers is the only way to improve the working conditions of small and marginal farmers.



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- This programme aims to work with small and marginal farmers especially the woman farmer for better agriculture productivity through scientific intervention and evolving best farming practices in the Indian context

Hubs and Spoke. In each of these 15 regions, a Farmer organisation will be the hub connected to different science labs, Krishi Vigyan Kendra and State Agriculture Universities co-located in the region. The hub will reach out to the farmers in the region and connect them to scientists and institutions.

Statement 3 is correct: Empower women: The woman farmer is often neglected. It is important to empower the woman farmer, help her by providing better seeds, storage of seed and protection of the crops from disease and pest. The woman farmer is also the prime caretaker of livestock and she is eager to combine traditional wisdom in handling the livestock and with current best practices, especially in the context of emerging livestock disease. The scheme includes the Mahila Biotech- KISAN fellowships, for training and education in farm practices, for women farmers. The Scheme also aims to support the women farmers/ entrepreneur in their small enterprises, making her a grass root innovator.

89. 'Westphalian system' recently seen in news means?

- Each state has right to expel illegal migrants
- Each state has an obligation to protect refugees under UN Refugee Convention
- East state has exclusive sovereignty over its territory
- Each state has exclusive rights over exclusive economic zone

Answer: c (Each state has exclusive sovereignty over its territory)

Explanation: The Westphalian system, also known as Westphalian sovereignty, is a principle in international law that each state has exclusive sovereignty over its territory. The principle developed in Europe after the Peace of Westphalia in 1648, based on the state theory of Jean Bodin and the natural law teachings of Hugo Grotius. It underlies the modern international system of sovereign states and is enshrined in the United Nations Charter, which

states that "nothing ... shall authorize the United Nations to intervene in matters which are essentially within the domestic jurisdiction of any state.

90. Consider the following statements about 'XPoSat' satellite

- It is India's first dedicated polarimetry mission
- The major objective of this mission is to understand the emission process from various astronomical sources
- POLIX and XSPECT are two payloads that are part of this mission

Which of the statements given above are correct?

- 1 and 2 only
- 1 and 3 only
- 2 and 3 only
- 1, 2 and 3

Answer: d (1, 2 and 3)

Statement 1 is correct: XPoSat (X-ray Polarimeter Satellite) is India's first dedicated polarimetry mission to study various dynamics of bright astronomical X-ray sources in extreme conditions.

And it will be the 60th mission launched from PSLV

Statement 2 is correct: The emission mechanism from various astronomical sources such as blackhole, neutron stars, active galactic nuclei, pulsar wind nebulae etc. originates from complex physical processes and are challenging to understand. While the spectroscopic and timing information by various space-based observatories provide a wealth of information, the exact nature of the emission from such sources still poses deeper challenges to astronomers. The polarimetry measurements add two more dimension to our understanding, the degree of polarization and the angle of polarization and thus is an excellent diagnostic tool to understand the emission processes from astronomical sources. The polarimetric observations along with spectroscopic measurements are expected to break the degeneracy of various theoretical models of astronomical emission processes. This would be the major direction of research from XPoSat by Indian science community.

Statement 3 is correct: The spacecraft will carry two scientific payloads in a low earth orbit. The primary



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payload POLIX (Polarimeter Instrument in X-rays) will measure the polarimetry parameters (degree and angle of polarization) in medium X-ray energy range of 8-30 keV photons of astronomical origin. The XSPECT (X-ray Spectroscopy and Timing) payload will give spectroscopic information in the energy range of 0.8-15 keV.

91. Consider the following statements about Trade and Technology Council (TTC) meetings

1. TTC agreement with EU was India's first ever TTC with any nation
2. This was signed for building robust supply chain for Iron and Steel products
3. TTC has 3 working groups of which Green and Clean Energy Technology is one of them
4. India has signed a Broad based Trade and Investment Agreement with EU

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: Trade and Technology Council (TTC) that India had signed with EU is first such agreement that India had signed with any other country

Statement 2 is incorrect: India and the European Union on Friday signed a Memorandum of Understanding on semiconductors that will help in building a "robust supply chain" and support innovation. The MoU was sealed during a "stock-taking call" between leaders of the EU-India Trade and Technology Council (TTC). The EU announced that the agreement will lead to sharing information on "granted public subsidies".

Statement 3 is correct: TTC has 3 working groups. They are

- Working Group on Strategic Technologies, Digital Governance, and Digital Connectivity
- Working Group on Green and Clean Energy Technologies
- Working Group on Trade, investment, and resilient value chain

Statement 4 is incorrect: The BTIA broad trade arrangement covers many factors of trade in goods, services, and investment. India is one of the EU's important, if not the largest, trading partners due to the fact that India accounted for 13.5% of total trade in 2015-2016. Thus the BTIA is important for both the EU and India. Both India and EU are negotiating BTIA for over a decade but however, there is not concrete agreement between them.

92. Consider the following pairs about the different hormones/glands in human body and their uses

Hormone/gland	Function
Pituitary gland	Growth, metabolism and reproduction
Thyroid	Controls the rate at which body uses fats and carbohydrates
Adrenal	Controls immune system, blood pressure and response to stress
Tyrosine	Involved in the structure of every protein in the body

How many pairs are correctly matched?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: d (All four)

Pair 1 is correctly matched: The main function of your pituitary gland is to produce and release several hormones that help carry out important bodily functions, including: Growth. Metabolism (how your body transforms and manages the energy from the food you eat). Reproduction.

Pair 2 is correctly matched: The thyroid is a small, butterfly-shaped gland located at the base of the neck, just below the Adam's apple. The thyroid gland makes two main hormones: thyroxine (T-4) and triiodothyronine (T-3). These hormones affect every cell in the body. They support the rate at which the body uses fats and carbohydrates.

Pair 3 is correctly matched: What You Need to Know. Adrenal glands, also known as suprarenal glands, are small, triangular-shaped glands located on top of both kidneys. Adrenal glands produce hormones that help regulate your metabolism,



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immune system, blood pressure, response to stress and other essential functions.

Pair 4 is correctly matched: Tyrosine also helps produce melanin, the pigment responsible for hair and skin color. It helps in the function of organs responsible for making and regulating hormones, including the adrenal, thyroid, and pituitary glands. It is involved in the structure of almost every protein in the body.

93. Consider the following statements about Insolvency and Bankruptcy Code (IBC)

1. Submission of proof of claims within 90 days of public announcement
2. It allows multiple resolution plans for a single stressed asset
3. Fast track Corporate Insolvency Resolution Process has eliminated the Adjudicating authority
4. Retail creditors will be given priority over institutional creditors in resolution process

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is correct: A creditor shall submit a claim with proof on or before the last date mentioned in the public announcement. Provided that a creditor, who fails to submit a claim with proof within the time stipulated in the public announcement, may submit his claim with proof to the interim resolution professional or the resolution professional, as the case may be, up to the date of issue of request for resolution plans under regulation 36B or ninety days from the insolvency commencement date, whichever is later.

Statement 2 is correct: The recent amendments in 2023, allowed multiple resolution plans for a single stressed firm.

Statement 3 is incorrect: Another change brought out by 2023 amendment is

Redesigning the Fast-Track Corporate Insolvency Resolution Process (FIRP):

- The ministry has also proposed redesigning the Fast-Track Corporate Insolvency Resolution Process (FIRP) to allow financial creditors to drive the insolvency resolution process for a CD outside of the judicial process while retaining some involvement of the Adjudicating Authority (AA) to improve the legal certainty of the final outcome.
- Further, the resolution plan approved through this procedure will have the same sanctity as a regular plan approved during the CIRP (Corporate Insolvency Resolution Process).

Statement 4 is incorrect: Financial creditors will be given priority over the retail creditors because to safeguard the financial sector which was faced with strong headwinds of burgeoning of NPAs

94. Consider the following statements about SARFAESI Act: 2002

1. It allows the banks and financial institutions to auction properties of defaulters
2. Under this act, RBI has got the power to regulate the Asset Reconstitution Company (ARC)
3. ARC has the power to transfer part of the debt of the defaulting company into equity
4. There are no remedies available to defaulter to recover his property under this act

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Statement 1 is correct: The Securitisation and Reconstruction of Financial Assets and Enforcement of Securities Interest Act, 2002 (also known as the SARFAESI Act) is an Indian law. It allows banks and other financial institutions to auction residential or commercial properties of defaulters to recover loans.

Statement 2 is correct: The first asset reconstruction company (ARC) of India, ARCIL, was set up under this act. By virtue of the SARFAESI Act 2002, the Reserve Bank of India has the authority to register and regulate Asset Reconstruction Companies (ARCs).



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Statement 3 is correct: The banks and Asset Reconstruction Companies (ARCs) should have the power to transfer any part of the debt of the defaulting company into equity. Such a translation would indicate that lenders or ARCs would become equity holders, instead of the creditor of the company.

Statement 4 is incorrect: SARFAESI Act Section 17 provides that borrowers can approach the Debt Recovery Tribunal to rectify their grievances against the creditor or authorised officer

95. Consider the following statements about the classification of assets by Financial Institutions in India

1. Standard assets are those who unable to repay loan amount for not less than 90 days
2. Sub-standard asset are those who remain as Non-Performing asset for less than 12 moths
3. Doubtful assets are those where the asset is a non-performing for more than 12 moths
4. Loss making assets are those assets which are written off wholly by the banking system

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Standard assets are those which do not disclose any problem and which does not carry more than normal risk attached to the business.

Statement 2 is correct: A sub-standard asset is one which has been classified as an NPA for a period not exceeding 12 months

Statement 3 is correct: Doubtful asset is those NPAs, if it has remained in the sub-standard category for a period of at least 12 months.

Statement 4 is incorrect: A loss asset is one where loss has been identified by the bank but amount has not been written off, wholly or partly. In other words such asset is considered uncollectible

96. Which countries became a part of Abraham Accord?

1. Israel

2. Palestine
3. UAE
4. USA

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Explanation: The Abraham Accords are bilateral agreements on Arab–Israeli normalization signed between Israel and the United Arab Emirates and Bahrain on September 15, 2020. Mediated by the United States, the initial announcement of August 13, 2020, concerned only Israel and the United Arab Emirates before the announcement of a follow-up agreement between Israel and Bahrain on September 11, 2020. On September 15, 2020, the official signing ceremony for the first iteration of the Abraham Accords was hosted by the Trump administration at the White House. As part of the dual agreements, both the United Arab Emirates and Bahrain recognized Israel's sovereignty, enabling the establishment of full diplomatic relations.

97. Which of the following countries are parts of Arab League?

1. Israel
2. Saudi Arabia
3. Somalia
4. Mali

How many of the above statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Explanation: The Arab League was formed in Cairo on 22 March 1945, initially with six members: Egypt, Iraq, Transjordan, Lebanon, Saudi Arabia, and Syria. Yemen joined as a member on 5 May 1945. Currently, the League has 22 members.

The League's main goal is to "draw closer the relations between member states and co-ordinate collaboration between them, to safeguard their



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independence and sovereignty, and to consider in a general way the affairs and interests of the Arab countries"

Members:

West Asia: Iraq, Jordan, Lebanon, **Palestine**, Syria, Saudi Arabia, UAE, Yemen, Oman, Kuwait, Qatar, Bahrain

North Africa: Egypt, Libya, Tunisia, Algeria, Morocco, Mauritania, Sudan, Djibouti, Somalia and Comoros.

98. Who are the members of "BRICS Plus Six" group?

1. Iran
2. Saudi Arabia
3. Egypt
4. Sudan

How many of the statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: c (Only three)

Explanation: One of the most significant outcomes of the 15th BRICS meeting is its expansion in membership to include six new members, including **Argentina, Egypt, Ethiopia, Iran, Saudi Arabia and the United Arab Emirates**. Noticeable among the new members is the heavy representation from the West Asian and African region. China's initial preference for Turkey, Mexico, Nigeria and Indonesia did not materialise. The expansion of this group has been the subject of much inquiry, particularly in terms of its impact on global governance and economic arrangements. BRICS expansion was triggered by the recent global isolation of Russia in the backdrop of the Ukraine conflict, China's aspirations to increase the multipolar camp against the US and South Africa's desire to make a substantial contribution as the host. India sees an expanded BRICS as a platform to enhance its economic opportunities and growth potential, as the Prime Minister's speech at the Business Forum indicated. As one of the fastest-growing economies in the world, India is keen to tap into the vast markets of the expanded BRICS

countries and attract investments from them. Saudi Arabia and UAE, for example, have committed more than \$100 billion in investments in India.

99. Consider the following statements about the favourable conditions for the cultivation of Turmeric

1. It is a Rabi crop, which grows well in 1500 m above sea level
2. It requires temperature ranges between 20-35°C
3. It required annual rainfall of 100 cm and below it, because it can tolerate extreme drought like conditions
4. Soil pH range of 4.5-7.5 with good organic status is needed

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: Turmeric is a Kharif crop which grows well in hot and humid climate and prospers in light black or red soil. Sowing of the root stalk is done during spring season and the plant becomes ready to harvest with in 7-8 months.

Statement 2 is correct: Turmeric can be grown in diverse tropical conditions from sea level to 1500 m above sea level, at a temperature range of 20-35°C.

Statement 3 is incorrect: An annual rainfall of 1500 mm (150 cm) or more, under rainfed or irrigated conditions it can grow well.

Statement 4 is correct: Though it can be grown on different types of soils, it thrives best in well-drained sandy or clay loam soils with a pH range of 4.5-7.5 with good organic status.

100. Consider the following statements about Ozone Layer depletion

1. Montreal Protocol, first universally ratified agreement is to protect the ozone layer by phasing down of ozone depleting substances
2. Kigali amendment is for gradually reducing the consumption and production of hydrofluorocarbons (HFCs)



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EXPLANATION

3. HFCs do not cause for ozone depletion but they have around 14,800 times more greenhouse gas potential than CO₂
4. India being a part of Group of Article 5 countries has obligation to start reduction of HCFC from 2028 onwards

How many statements given above are correct?

- (a) Only one
- (b) Only two
- (c) Only three
- (d) All four

Answer: b (Only two)

Statement 1 is incorrect: The Montreal Protocol is an international treaty designed to protect the ozone layer by **phasing out** the production of numerous substances that are responsible for ozone depletion. It was agreed on 16 September 1987, and entered into force on 1 January 1989.

Statement 2 is correct: The Kigali Amendment to the Montreal Protocol is an international agreement to gradually reduce the consumption and production of hydrofluorocarbons (HFCs). It is a legally binding agreement designed to create rights and obligations in international law.

Statement 3 is correct: Although HFCs are harmless to the ozone layer, they are potent greenhouse gases. While their lifespan in the atmosphere is short (10 to 20 years) relative to carbon dioxide (CO₂), HFCs filter infrared waves much more powerfully. HFCs are therefore thousands of times more heat-trapping than CO₂, with a global warming potential (GWP) of 12 to 14,800. Eliminating emissions of these gases could significantly lower the effects of global warming and avoid a full 0.5 degree Celsius of warming above preindustrial levels by the end of the century.

Statement 4 is incorrect: Article 5 of the Montreal Protocol created separate standards for developing countries and non-developing. Whether a country was categorized as developing or non-developing depended on individual economic conditions at the time of the agreement or pending special request. Because the Protocol was created in the 1980s and countries economic situations have changed, the Kigali Amendment created three updated groups for compliance with the additional terms.

The first group, which includes the "old" industrialized countries, is committed to reducing the use of HFCs by 45% by 2024 and by 85% by 2036, compared to their use between 2011 and 2013. A second group, which includes China and Brazil, is committed to reducing its consumption by 80% by 2045. Finally, this deadline is extended to 2047 for the rest of the countries, including India and a number of countries in the Middle East, which are large consumers of air conditioning.