

## ANSWER KEY

### 1. D

**Both the statements are incorrect**

The Central Pollution Control Board (CPCB) is a statutory organization in India that was established in 1974 under the Water (Prevention and Control of Pollution) Act, 1974. It is responsible for protecting the environment by preventing and controlling pollution, and it has the authority to enforce pollution control laws in the country.

The Central Ground Water Authority (CGWA) is a statutory organization in India that was established in 1997 under the Environment Protection Act, 1986. The CGWA is responsible for regulating and managing the development and use of ground water resources in the country, with the goal of ensuring that these resources are used sustainably and efficiently.

### 2. B

**Options 1, 2 and 3 are correct**

**Option 4 is incorrect**

Red pandas are native to the Himalayas in Asia, and they are found in parts of Nepal, India, Bhutan, and China. They typically inhabit temperate forests, particularly those with bamboo undergrowth, at elevations between 2,200 and 4,800 meters above sea level.

Narcondam hornbill is endemic to the Narcondam islands in the Andamans.

Coconut crabs are a species of terrestrial hermit crab that are found on islands in the Pacific and Indian Oceans.

Long-tailed macaques are a species of monkey that are found in Southeast Asia including Andaman and Nicobar Islands.

### 3. A

**Statement 1 is correct.**

**Statement 2 is incorrect.**

The UN Conference on Human, Environment and Development held at Stockholm was the one which gave birth to the Stockholm Declaration on the Human Environment of 1972. This Stockholm Declaration is considered to be the magna carta of Environmental law. The conference of Stockholm was attended by the then Prime Minister of India, Indira Gandhi and she got inspired a lot by the discussions held, issues raised and development took place during that conference. The result of this was the addition of article 48A through 42<sup>nd</sup> constitutional amendment act.

India participated in the Stockholm+50 conference and emphasized on promoting mindful consumption, reduction of waste and promotion of resource efficiency and circular economy to save the planet earth.

### 4. A

The Cactus Garden is a unique botanical garden at the Statue of Unity site in Gujarat, created to exhibit a huge variety of Cacti and succulents, the true miracles of adaptation. The thought behind the development of the cactus garden is to provide an experience of the desert ecosystem in the midst of a landmass well entrenched in an aquatic surrounding.

### 5. C

**Both statements are correct**

Phosphogypsum is a byproduct of the production of fertilizers from phosphate rock. It is a waste material that is created when phosphoric acid is produced from phosphate ore. The phosphoric acid is then used to manufacture fertilizers, and the byproduct of this process is phosphogypsum. It is used in agriculture for soil amendment or as fertilizer, as well as in the brick and cement industry, and in road construction.

Phosphogypsum contains low levels of radioactivity and is considered slightly hazardous to the environment because of its potential to release radon gas.

### 6. C

The Forest Rights Act (FRA) of 2006 is a law in India that recognizes and vest the forest rights and occupation in forests for habitation of traditionally forest dwelling Scheduled Tribes (STs) and other forest

dwelling Scheduled Castes (SCs) and traditional forest dwellers, who have been residing in such forests for generations, but whose rights could not be recorded.

In order to be recognized as a traditional forest dweller under the FRA, an individual must meet certain criteria, including:

- Residing in the forest or forest land for at least three generations (75 years) prior to December 13, 2005 (the date the FRA was passed)
- Dependence on the forest or forest land for a livelihood, including but not limited to subsistence, fuel, fodder, and shelter
- Traditional rights to the use of the forest or forest land
- Lack of any other rights or entitlements to land outside the forest or forest land

### 7. B

Photochemical smog is a mixture of pollutants that are formed when nitrogen oxides and volatile organic compounds (VOCs) react to sunlight, creating a brown haze above cities. It tends to occur more often in summer, as it requires sunlight. Photochemical smog is typically found in urban areas with high levels of vehicle traffic and industrial activity. The reactions that create photochemical smog produce a variety of harmful pollutants, including ozone, particulate matter, and aldehydes.

Classical smog is mixture of smoke, fog and sulphur dioxide. It is also known as London smog or coal smog. It is characterized by a thick, fog-like haze that is made up of a mixture of smoke, sulfur dioxide, and other pollutants. Classical smog is caused by the burning of coal, which releases a variety of pollutants into the air, including particulate matter, sulfur dioxide, and other gases.

### 8. B

**Statement 1 is incorrect.**

**Statement 2 is correct.**

There is no known safe level of lead in the blood. Lead is a toxic metal that can have harmful effects on the human body, even at low levels of exposure. The WHO Guideline for Clinical Management of Exposure to Lead recommends a blood lead concentration of 5 micrograms per decilitre ( $\mu\text{g/dL}$ ) as a trigger for a thorough review of the ways in which a person is being exposed to lead and for action to reduce or end this exposure.

Mining, smelting, manufacturing and recycling activities, and the continued use of leaded paint, leaded gasoline, and leaded aviation fuel (in some countries) are important sources responsible for environmental contamination. Drinking water supplied through lead pipes or pipes joined with lead solder may contain lead. BIS Drinking Water Specifications (IS-10500 1991) prescribes the lead content in water not to exceed 50 parts per billion, in India it shockingly ranges from 50 to 400 parts per billion.

### 9. D

**All the options are correct.**

National Bioenergy Programme is an initiative of the Ministry of New and Renewable Energy recommended for the period from FY 2021-22 to 2025-26. The Programme will be implemented in two Phases.

It comprises of the following sub-schemes:

- Waste to Energy Programme (Programme on Energy from Urban, Industrial and Agricultural Wastes /Residues) to support the setting up of large Biogas, BioCNG and Power plants (excluding MSW to Power projects)
- Biomass Programme (Scheme to Support Manufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries) to support setting up of pellets and briquettes for use in power generation and non-bagasse-based power generation projects.
- Biogas Programme to support setting up of family and medium size Biogas in rural areas.

### 10. D

**Options 1, 2 and 4 are correct**

**Option 3 is incorrect**

Light pollution is the excess artificial light that is present in the environment, and it can have a variety of negative impacts on both the environment and human health. Some of the impacts of light pollution include:

- Disruption of ecosystems – it can interfere with the natural rhythms of plants and animals, affecting their behavior and reproductive cycles. For example, it can disrupt the migration patterns of birds and the flowering patterns of plants.
- Energy waste: Excess artificial light can be a waste of energy, as it is often directed upwards or outwards instead of towards a specific task or area.
- Climate change: The production of electricity for artificial lighting is a major contributor to greenhouse gas emissions, which contribute to climate change.
- Human health: Exposure to artificial light at night can disrupt the body's natural sleep-wake cycle, leading to sleep disorders and other health problems.
- Aesthetics and astronomy: Light pollution can reduce the visibility of the night sky, reducing our ability to see stars and other celestial objects. Thus, it is a concern for the astronomers as it reduces their ability to view celestial objects.

#### 11. C

*Ficus religiosa* is the scientific name for Peepal tree and it is native to the Indian subcontinent.

#### 12. C

**Both the statements are correct.**

Short-lived climate pollutants are powerful climate forcers that remain in the atmosphere for a much shorter period of time than carbon dioxide (CO<sub>2</sub>), yet their potential to warm the atmosphere can be many times greater. Certain short-lived climate pollutants are also dangerous air pollutants that have harmful effects for people, ecosystems and agricultural productivity. The short-lived climate pollutants black carbon, methane, tropospheric ozone, and hydrofluorocarbons are the most important contributors to the man-made global greenhouse effect after carbon dioxide, responsible for up to 45% of current global warming.

In 2012, the governments of Bangladesh, Canada, Ghana, Mexico, Sweden and the United States, along with the United Nations Environment Programme (UNEP), came together to initiate efforts to treat short-lived climate pollutants as an urgent and collective challenge. Together, they formed the **Climate & Clean Air Coalition**. Currently India is also a participant in it.

#### 13. C

The Ministry of Environment, Forest and Climate Change has notified the Plastic Waste Management Amendment Rules 2021, prohibiting manufacture, import, stocking, distribution, sale and use of the following identified single use plastic items, which have low utility and high littering potential with effect from the 1st July, 2022:

- ear buds with plastic sticks, plastic sticks for balloons, plastic flags, candy sticks, ice-cream sticks, polystyrene [Thermocol] for decoration;
- plates, cups, glasses, cutlery such as forks, spoons, knives, straw, trays, wrapping or packing films around sweet boxes, invitation cards, and cigarette packets, plastic or PVC banners less than 100 micron, stirrers.

PET (polyethylene terephthalate) is a type of plastic that is commonly used to make food and beverage containers, such as water bottles and soda bottles. PET is relatively easy to recycle, and it is one of the most widely recycled types of plastic.

Bioplastics are made wholly or in part from renewable biomass sources such as sugarcane and corn, or from microbe such as yeast. Some bioplastics are biodegradable or even compostable, under the right conditions. Bioplastics made from renewable resources can be naturally recycled by biological processes, thus limiting the use of fossil fuels and protecting the environment. Therefore, bioplastics are sustainable, largely biodegradable, and biocompatible.

#### 14. D

**All the options are correct.**

Lifestyle for the Environment (LiFE) Movement is an India-led global mass movement to nudge individual and community action to preserve the environment.

Ministry of Consumer Affairs has set up a committee chaired by Nidhi Khare to construct a framework for the 'right to repair'. Under this regulatory framework, it would be mandatory for manufacturers to share their product details with customers so that they can either repair them by self or third parties, rather than depending on original manufacturers.

Regular defreezing reduces energy consumption

Plogging refers to the activity of picking up trash while jogging.

#### 15. D

As per State of forest report 2021,

West Bengal (42.33%) > Gujarat (23.54%) > Andhra Pradesh (8.11%) > Odisha (5.17%)

#### 16. D

**All the statements are correct.**

The 15th Conference of Parties (COP15) to the UN Convention on Biological Diversity (CBD) adopted the Kunming-Montreal Global Biodiversity Framework (GBF). The framework has 23 targets that the world needs to achieve by 2030.

The targets under it include stopping the extinction of known species, reducing the risk from pesticides, reducing global footprint of consumption etc

#### 17. A

**Options 1, 3 and 5 are correct.**

Plastic fibers are fibers that are made from plastic, which is a synthetic or semi-synthetic material that is made from a wide variety of organic polymers, such as polyethylene, PVC, nylon, etc. Some examples of it are polyester, nylon, rayon, acrylic, and spandex.

Linen is a natural, plant-based fiber that is made from the stem of the flax plant.

Abaca textiles are fabrics that are made from the fibers of the abaca plant, which is a type of plant in the Musa genus that is native to the Philippines.

#### 18. D

**Both the statements are incorrect.**

International Union for the Protection of New Varieties of Plants (UPOV) is a treaty created outside the UN to provide a regulatory system for protecting plants.

India has refused to join UPOV since it denies farmers any rights, such as the freedom to reuse farm-saved seeds and to exchange them with their neighbours, which is a tradition in this country of poor farmers. With the World Trade Organization's all-encompassing IPR agreement on Trade Related Aspects of Intellectual Property Rights coming into force, India had the choice of either joining UPOV or to formulate sui generis system that granted protection to breeders' rights while keeping farmers' interests uppermost. The result was the Protection of Plant Varieties and Farmers Rights Act of 2001 which balances the interests of both while encouraging innovation in new varieties.

#### 19. B

**Statement 1 is incorrect.**

**Statement 2 is correct.**

As per the National Wildlife Action Plan (2002-2016), issued by the Union Ministry of Environment, Forest and Climate Change, land within 10 km of the boundaries of national parks and wildlife sanctuaries is to be notified as eco-fragile zones or Eco-Sensitive Zones (ESZ). While the 10-km rule is implemented as a general principle, the extent of its application can vary from protected area to protected area.

2011 Guidelines by the Environment Ministry provides a list of activities prohibited in an ESZ, such as commercial mining, saw mills, commercial use of wood, etc. It also mentions permitted activities like ongoing agricultural or horticultural practices, rainwater harvesting, renewable energy, organic farming etc.

**20. D****All the options are correct**

Allelopathy is a common biological phenomenon by which one organism produces biochemicals that influence the growth, survival, development, and reproduction of other organisms. Some common trees with allelopathic properties include black walnut tree, eucalyptus, sugar maple, tree-of-heaven, hackberry, southern waxmyrtle, American sycamore, cottonwood, black cherry, red oak, black locust, sassafras, and American elm.

**21. D****All the statements given are correct**

The term “loss and damage” is used to describe the manifestation of climate change impacts which are not or cannot be avoided by adaptation and mitigation efforts (i.e., reducing emissions). Loss and damage from climate change impacts can result from extreme weather events such as storms and floods, as well as from slow onset climatic processes which include increasing temperatures, desertification, loss of biodiversity, land and forest degradation, glacial retreat and related impacts, ocean acidification, sea level rise, and salinisation.

In 2007 at **COP 13 in Bali**, the term “loss and damage” was first seen in a UNFCCC decision, driven by Alliance of Small Island States (AOSIS) and other vulnerable developing country Parties. In 2010 at **COP 16 in Cancun**, a work programme was established to increase the understanding of how to assess and address climate related loss and damage. That led to the establishment of the **Warsaw International Mechanism on loss and damage (WIM)**. In 2015 at COP 21 in Paris, Loss and Damage was included in a dedicated article in the Paris Agreement. At **COP 25** in Madrid 2019 the **Santiago Network on averting, minimising and addressing loss and damage (SNLD)** was established as part of the WIM. The SNLD’s objective is to catalyse the technical assistance of relevant organisations, bodies, networks and experts, for the implementation of relevant approaches for averting, minimising and addressing loss and damage at the local, national and regional level. At **CoP27** decision for creation of a **loss and damage fund** was taken.

**22. A**

Phytoplankton and algae form the bases of aquatic food webs. They are eaten by primary consumers like zooplankton, small fish, and crustaceans. Primary consumers are in turn eaten by fish, small sharks, corals, and baleen whales.

Dinoflagellata are algae, copepods are a group of small crustaceans and herrings are a species of slab-sided northern fish belonging to the family Clupeidae.

**23. D****All the options are correct**

The Union Cabinet approved National Green Hydrogen Mission that aims to make India a Global Hub for production, utilization and export of Green Hydrogen and its derivatives. The Mission will result in the following likely outcomes by 2030:

- Development of green hydrogen production capacity of at least 5 MMT (Million Metric Tonne) per annum with an associated renewable energy capacity addition of about 125 GW in the country
- Over Rs. Eight lakh crores in total investments
- Creation of over Six lakh jobs
- Cumulative reduction in fossil fuel imports over Rs. One lakh crore
- Abatement of nearly 50 MMT of annual greenhouse gas emissions

Green hydrogen is not commercially viable at present. The current cost in India is around Rs 350-400 per kg; it is likely to become viable only at a production cost of under Rs 100/ kg. This is what the Hydrogen Energy Mission aims for.

**24. C**

The India Cooling Action seeks to (i) reduce cooling demand across sectors by 20% to 25% by 2037-38, (ii) reduce refrigerant demand by 25% to 30% by 2037-38, (iii) Reduce cooling energy requirements by 25% to 40% by 2037-38, (iv) recognize “cooling and related areas” as a thrust area of research under national S&T

Programme, (v) training and certification of 100,000 servicing sector technicians by 2022-23, synergizing with Skill India Mission.

It aims to promote indigenous development of low global warming potential refrigerants, while HFC is a high global warming potential refrigerant.

**25. C**

**Options 1 and 3 are correct**

**Option 2 is incorrect**

Jurisdiction of the National Green Tribunal extends to the following acts:

- The Water (Prevention and Control of Pollution) Act, 1974;
- The Water (Prevention and Control of Pollution) Cess Act, 1977;
- The Forest (Conservation) Act, 1980;
- The Air (Prevention and Control of Pollution) Act, 1981;
- The Environment (Protection) Act, 1986;
- The Public Liability Insurance Act, 1991;
- The Biological Diversity Act, 2002

NGT is not empowered to hear matters pertaining to issues coming under the ambit of the Wildlife (Protection) Act, 1972.

**26. C**

**Both statements are correct.**

Ecosystem services are the benefits provided by ecosystems in favour of human beings. They are categorised as Provisioning, Regulating, Supporting and Cultural services.

Technological interventions in the form of Remote sensing and Artificial intelligence in ecosystem management, climate engineering etc can enhance ecosystem services.

Ecosystem service can become less effective due to non-human biotic factors of an ecosystem. Eg-invasive species destroying natural ecosystem, animal excreta and carcasses polluting water bodies, dormant microbes spreading diseases.

**27. D**

Sustainable development has been defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It should endeavour to achieve intragenerational as well as intergenerational parity. Stringent environmental protection, neglecting inclusive and equitable social and economic development cannot be considered as Sustainable development.



28. A

**Options 1, 3 and 4 are correct**

**Option 2 is incorrect**

Carbon enters into the atmosphere through various processes like respiration, decomposition of organic matter, burning of fossil fuels, land use change, forest fires, burning fuelwood etc. Sedimentary rocks contain carbon in the form of carbonates and rock organic carbon. These are released into the atmosphere upon weathering.

In photosynthesis, Carbon from the atmosphere is taken by green plants.

29. B

**Options 3, 4 and 5 are correct**

**Options 1 and 2 are incorrect**

As per the Ramsar Convention, a wetland is defined as 'areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tides does not exceed six meters'.

Major wetland types in India are-

Marshes, Estuaries, Swamps, Lakes, Oxbow lakes, River floodplains and human-made wetlands like dams, reservoirs, ponds etc.

Bogs and Fens are commonly found in Northern latitudes.

30. A

**Statement 1 is correct**

**Statements 2 and 3 are incorrect**

Nitrogen fixation is the process of conversion of elemental form nitrogen to ammonia, nitrites or nitrates, which can be taken up by plants. Denitrification is the process by which the nitrates/nitrites are converted to elemental nitrogen which escapes into the atmosphere.

Azotobacter and Clostridium are free-living nitrifying bacteria whereas Pseudomonas are prominent denitrifying bacteria.

**31. A**

**Statement 1 is correct**

**Statement 2 is incorrect**

Mangroves are ecosystems typical to intertidal regions of coastal areas. In contrast to most plants, mangroves have poorly developed, shallow below-ground root systems while having well-developed aerial roots. Mangroves occur in a variety of root configurations such as adventitious roots, arching from the tree into the water, and pneumatophores, which grow out of the mud and water facilitating aeration. The roots help to impede water flow and help to stabilise coastal shores, thus acting as a buffer between the sea and the coast. These typical root systems (prop or pneumatophores) of mangroves give them the strength to counter hazards like cyclones by breaking up the force of the storm surge and arresting fast-blowing winds.

**32. A**

**Statements 1 and 2 are correct**

**Statement 3 is incorrect**

Tropical Rainforests are the most biodiversity-rich region of the Earth. These are located near the Equator and receive high levels of insolation and precipitation (above 200cm).

The soil in tropical rainforests is generally nutrient-poor and non-fertile. High insolation and high amounts of rainfall facilitate the fast uptake of nutrients from decomposing organic matter by plants, leaving the soil non-fertile.

Ice caps and snow cover of the Arctic and Alpine Tundras are the regions having higher albedo. Very low level of biodiversity is characteristic of these regions.

**33. A**

**Statements 1 and 4 are correct**

**Statements 2 and 3 are incorrect**

Frequent tillage of soil helps in increased aeration of the soil, percolation of rainwater into the soil, recharge of groundwater, uproots all undesired growth thus reducing weed population and facilitate deeper penetration of roots. However frequent tillage may disturb the habitats of desired microbes thus reducing microbial activity, or increase the chance of soil erosion due loss of integrity of soil particles.

**34. D**

**Both statements are incorrect.**

Indicator species is a species whose presence or absence indicates the presence or absence of a set of other species. They are the most sensitive species in an ecosystem and have a very low



level of tolerance to changing biotic and abiotic factors. Thus they help in monitoring the health of an ecosystem. Eg- Lichens are indicators of air quality

Keystone species is a species whose addition to or loss from an ecosystem leads to major changes in abundance or occurrence of at least one other species. Their interactions with other living beings are very high to the extent that the loss of keystone species will result in the degradation of the whole ecosystem. Eg- apex predators, pollinators

### **35. A**

**All statements are correct.**

Greenhouses are artificial structures made of transparent materials like glass, built for maintaining regulated atmospheric conditions favourable for plant growth. It finds more utility in cold regions where insolation received is less than optimal for plant growth.

Greenhouses prevent warm air, heated through solar radiation often supplemented with artificial furnaces, from escaping via convection. Thus the interior of the greenhouse would be significantly warmer than the exterior.

The greenhouses with interiors made of materials with a high coefficient of reflection facilitate infrared radiative cooling, thus increasing its efficiency.

### **36. C**

Vulnerability to climate change is determined by a variety of factors which include sensitivity or susceptibility to harm, capacity and preparedness to cope with and adapt to changing climatic conditions.

In addition to the incidence and intensity of climatic events vulnerability is determined by the extent to which it disrupts the life and livelihood of the inhabitants of a region. Thus, vulnerability has a direct correlation with the population of a region.

An island in temperate zone is vulnerable to heat waves, cold waves, coastal erosion, rising sea level, and more erratic rainfall.

Foothills of mountains are susceptible to extreme climatic events like flooding, landslides, cloudbursts, avalanches etc.

Continental town in tropical zone is vulnerable to heat waves, droughts, urban floods etc.

### **37. D**

Wide range of factors influence the phenomenon of Green House effect. The gravitational force of the Earth determines the concentration of greenhouse gases at any particular point in the atmosphere. Consequently, at higher altitudes, less concentration of greenhouse gases implies reduced greenhouse effect and reduced temperature. While gases like N<sub>2</sub> and O<sub>2</sub> are transparent to infrared radiation, other gases like CO<sub>2</sub>, N<sub>2</sub>O, CH<sub>4</sub>, SF<sub>6</sub> etc. absorb and emit radiant energy within the thermal infrared range. The wavelength of radiation absorbed is determined by the atomic and molecular properties of the gases.

The Coriolis effect due to the rotation of the Earth does not play any major role in the greenhouse effect.

### 38. A

Statements 1, 2 and 3 are correct

Statement 4 is incorrect

Ground level Ozone is a secondary pollutant formed by the chemical reactions between oxides of nitrogen (NO<sub>x</sub>) and Volatile Organic Compounds (VOC) in the presence of sunlight.

It affects the respiratory system and worsens preexisting conditions like asthma. It also increases the chances of Chronic Obstructive Pulmonary Disease. It affects crops and plant life in general.

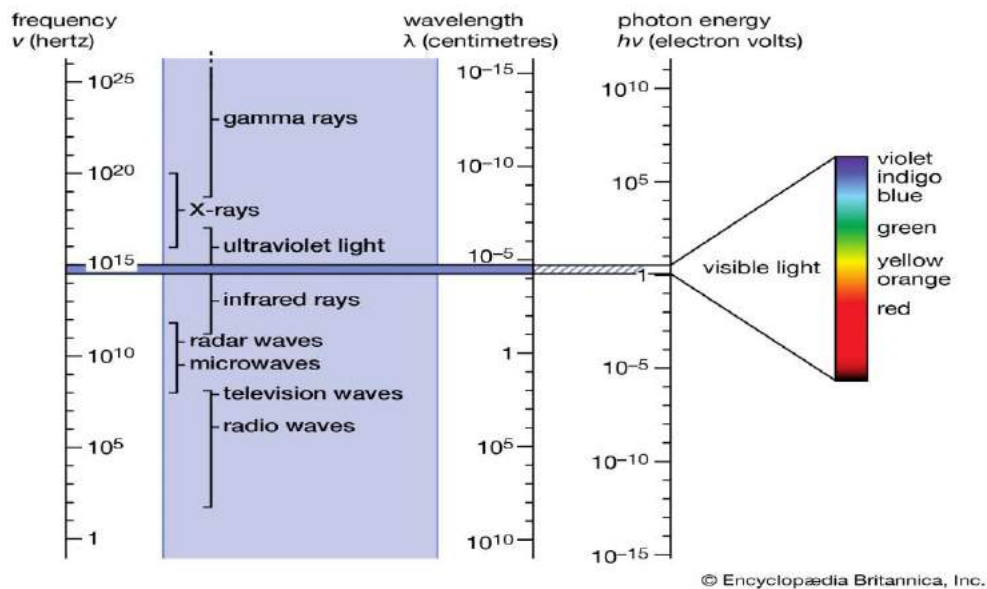
The global warming potential of Ozone is comparatively very high causing elevated temperatures in already hot regions.

Oxides of nitrogen, Volatile organic compounds, aldehydes, tropospheric ozone, and peroxyacyl nitrates (PAN) are all responsible for the production of photochemical smog.

Chlorofluorocarbons (CFC) are compounds responsible for Ozone layer depletion.

### 39. B

Energy of radiation is directly proportional to its frequency.



Ozone formation is caused by high-frequency ultraviolet radiation.

Green plants utilise the visible spectrum of sunlight for photosynthesis.

The greenhouse effect is caused by long-wave terrestrial infrared radiation.

**40. A**

**Options 1 and 3 are correct**

**Option 2 is incorrect**

Lichens are a symbiotic relationship between fungus and cyanobacteria or algae. The non-fungal part contains chlorophyll.

Mycorrhizae is a symbiotic association between plant roots and fungi.

Mosses are small, non-vascular flowerless plants.

**41. D**

**All the four** World Heritage sites are home to glaciers.

Recently, a study conducted by UNESCO has found that a third of the glaciers on the UNESCO World Heritage list is under threat, regardless of efforts to limit temperature increases. 50 UNESCO World Heritage sites are home to glaciers, representing almost 10% of the Earth's total glacierized area.

Glaciers in Yellowstone National Park (United States of America) are very likely to disappear by 2050. Glaciers in all World Heritage sites in Africa will very likely be gone by 2050, including Kilimanjaro National Park and Mount Kenya. Glaciers in Pyrenees Mont Perdu (France, Spain) – very likely to disappear by 2050.

**42. C**

**Statements 1 and 2 are correct.**

**Statements 3 and 4 are incorrect.**

**Black carbon (BC) aerosol**, often called soot, is the dominant form of light absorbing particulate matter in the atmosphere. BC is emitted by incomplete combustion processes, both human and natural (e.g., wildfire). BC has strong absorption of light from **ultraviolet to near-infrared wavelengths** and it contributes to global warming. Its ability to absorb **visible and infrared radiation** means BC can heat the atmosphere and darken surfaces, specifically snow and ice.

Unlike long-lived greenhouse gases such as carbon dioxide, BC is removed from the atmosphere in 1-2 weeks, so its impacts tend to be more regional rather than global.

Black carbon deposition in snow reduces the albedo of surfaces — a measure of how much of Sun's radiations are reflected. This accelerates the melting of glaciers and snow cover, thus changing the hydrological process and water resources in the region.

**43. A**

State of the Global Climate Report is annually released by the World Meteorological Organization (WMO).

Extreme heatwaves, drought and devastating flooding have affected millions and cost billions this year, according to the WMO Provisional State of the Global Climate in 2022 report.

The rate of sea level rise has doubled since 1993. It has risen by nearly 10 mm since January 2020 to a new record high this year. The past two and a half years alone account for 10 percent of the overall rise in sea level since satellite measurements started nearly 30 years ago.

**44. D**

Ocean acidification is impacting many ocean species, especially organisms like **oysters and corals that make hard shells and skeletons by combining calcium and carbonate** from seawater. As ocean acidification increases, available carbonate ions (CO<sub>3</sub><sup>2-</sup>) bond with excess hydrogen, resulting in fewer carbonate ions available for calcifying organisms to build and maintain their shells, skeletons, and other calcium carbonate structures. If the pH gets too low, shells and skeletons can even begin to dissolve.

While some species will be harmed by ocean acidification, certain *algae and seagrasses* may benefit from higher CO<sub>2</sub> conditions in the ocean, as they require CO<sub>2</sub> for photosynthesis just like plants on land.

**45. C**

**Statements 1, 2 and 3 are correct.**

**Statement 4 is incorrect.**

Blue forests are coastal and marine ecosystems, including mangrove forests, seagrass meadows and tidal salt marshes. They play an important role in protecting marine biodiversity and supporting the livelihoods of coastal and island communities.

The Blue Forests Project is a global partnership that improves the management of coastal carbon and ecosystem services to build climate resilient and sustainable communities.

It is an initiative of the *United Nations Environment Programme (UNEP)*, funded by the *Global Environment Facility (GEF)* and co-financed by project partners, and managed by GRID-Arendal.

The Blue Forests Project will build on existing activities in selected countries (United Arab Emirates (U.A.E.), Ecuador, Indonesia, Madagascar and Mozambique) to ‘push’ the blue forests concept. Currently, there is *no site from India* included in the project.

**46. A**

**Statement 1 is correct.**

**Statement 2 is incorrect.**

The Bonn Challenge is a global goal to bring 150 million hectares of degraded and deforested landscapes into restoration by 2020 and 350 million hectares by 2030. Launched by the *Government of Germany and IUCN* in 2011, the Challenge surpassed the 150-million-hectare milestone for pledges in 2017.

**47. D**

**Statement 2 is correct**

**Statements 1 and 3 are incorrect.**

COP27 was held in Egypt. It is not the first that a COP of UNFCCC was held in Africa. Kenya, Morocco etc. had hosted COPs in the past. The first COP meeting was held in Berlin, Germany in March, 1995.

Major outcomes of COP 27

- It decided to establish and operationalize a loss and damage fund. The methodology and principles of funding are yet to come
- Agreements on mitigation measures only include a coal phase down (instead of a phase out) and ignore emissions from the use of gas and oil

- Action on Water Adaptation or Resilience (AWARe) is an initiative launched by COP 27 presidency that will champion inclusive cooperation to address water-related challenges and solutions across climate change adaptation.
- For the first time, the COP27 decision text included a call for reforming the global financial system, particularly multilateral development banks (MDBs), to make them more supportive of climate action.

**48. A**

The Coalition for Disaster Resilient Infrastructure (CDRI) was launched by India at the 2019 UN Climate Action Summit. It is an international coalition of countries, United Nations (UN) agencies, multilateral development banks, the private sector, and academic institutions, that aims to promote disaster-resilient infrastructure and to promote research and knowledge sharing in the fields of infrastructure risk management, standards, financing, and recovery mechanisms.

A five-fold strategy to fight climate change, termed as Panchamrit, was announced by Indian PM at the COP26 meeting at Glasgow. The strategy includes among other things a target of reaching Net Zero by 2070.

The ENACT initiative was launched by Germany and IUCN at COP 27 to coordinate global efforts to address climate change, land and ecosystem degradation, and biodiversity loss through Nature-based Solutions (NbS).

**49. B**

The Argo program is a collaborative partnership of more than 30 nations from all continents (including India through INCOIS) that maintains a global array and provides a dataset anyone can use to explore the ocean environment. Argo is a component of the Global Ocean Observing System (GOOS) and is coordinated by the Argo Steering Team, an international body of scientists and technical experts that meets once per year.

It aims to measure water properties across the world's ocean. The main reason for collecting these data is to help us understand the oceans' role in earth's climate and so be able to make improved estimates of how it will change in the future.

**50. A**

**Statement 1 is correct.**

**Statement 2 is incorrect.**

Kelp forests are usually found in arctic and temperate waters across the world. The absence of kelps in the tropic regions is the lack of nutrients in the warm oligotrophic waters.

In ideal conditions, kelp can grow up to 18 inches per day, and in stark contrast to the colorful and slow-growing corals, the giant kelp canopies tower above the ocean floor.

**51. A**

**Statement 1 is correct.**

**Statements 2 and 3 are incorrect.**

*Dhara Mustard Hybrid (DMH-11)* has been provided with environmental clearance by the Ministry of Environment, Forest and Climate Change (MoEFCC) for open field trials in India, following the appraisal of the Genetic Engineering Appraisal Committee. DMH-11 is not yet approved for commercial cultivation. So far India has approved only one GM crop, Bt cotton, for commercial cultivation.

Traditional cross-breeding methods aimed at **changing the genetic makeup are challenging and time-consuming as Mustards are self-pollinating** with male (anther) and female (pistil) reproductive parts present in the same flower. Genetic manipulation allows scientists to avoid

these problems and directly change the genetic makeup of a plant so that it exhibits the desired trait.

Genes chosen from soil bacterium *Bacillus amyloliquefaciens*, control male fertility and another from *Streptomyces hygroscopicus* bacteria provides weedicide resistance.

**52. A**

**Options 1, 2 and 3 are correct.**

**Option 4 is incorrect.**

Acid Rain is said to occur when the pH of rainwater falls below 5.6. It is caused by the interaction of oxides of Sulphur and Nitrogen with the rainwater.

**The possible reasons for the occurrence of acid rain in a place are-**

*Proximity to an erupting volcano-* Volcanic eruptions result in large emissions of gasses like Sulphur Dioxide causing acid rain.

*Presence of thermal power plants-* Burning of fossil fuels, such as coal, in power plants results in the emission of oxides of nitrogen and sulphur.

*Nearby site for copper production-* Most copper ores are sulphur-based and smelting releases sulphur dioxide which might cause acid rain.

Green hydrogen is produced by the electrolysis of water using renewable energy. Hence emissions are reduced around *Green Hydrogen plants* which decreases the chances of acid rain.

**53. D**

**Statements 1, 2 and 3 are correct**

**Statement 4 is incorrect**

**Zero Budget Natural Farming (ZBNF)** means raising crops without using any fertilizers, pesticides or any other external inputs. Four main elements of ZBNF are *Bijamarita*, *Jeevamrita*, *Acchadana* and *Waaphasa*

It reduces the cost of production due to the elimination of the need for fertilisers, pesticides etc. as well as due to reduction in usage of water and electricity by 50-60%. Minimal disturbance of soil and practices like mulching facilitates the protection of topsoil. ZBNF reduces methane emissions due to multiple aerations.

Although it ensures a reduction in farmers' input costs, no drastic improvement in yield has been recorded.

**54. C**

**Per- and Polyfluoroalkyl substances (PFAs)** are man-made chemicals used to make nonstick cookware, water-repellent clothing, stain-resistant fabrics, cosmetics, firefighting forms and many other products that resist grease, water and oil. PFAs are referred to as "*forever chemicals*" because of their tendency to contaminate the atmosphere, rainwater and soil for long periods of time. Some of these PFAs can build up in people and animals if they are repeatedly exposed to the chemicals. Health risks that are attributed to PFA exposure include decreased fertility, developmental effects in children, interference with body hormones, increased cholesterol levels, increased risk of some cancers as well as a reduced immune response to diseases even after vaccinations.

**55. B**

**Pairs 2 and 4 are correct**

**Pairs 1 and 3 are incorrect**

**International Nitrogen Initiative (INI)** is an international program, set up in 2003 under the sponsorship of the Scientific Committee on Problems of the Environment (SCOPE) and from the International Geosphere-Biosphere Program (IGBP). The key aims of the INI are to optimize nitrogen's beneficial role in sustainable food production and minimize nitrogen's negative effects on human health and the environment resulting from food and energy production

United Nations Conference on Trade and Development (UNCTAD) is promoting "**Blue Deal**" to create a sustainable and resilient ocean economy that benefits all, at the 2022 United Nations Ocean Conference.

A broad coalition of 20 governments, led by Chile and Iceland, joined together to create a new high-level group '**Ambition on Melting Ice: On Sea-level Rise and Mountain Water Resources**' at COP27 in Sharm El-Sheikh, Egypt. The "AMI" group aims to ensure impacts of cryosphere loss are understood by political leaders and the public, not only within the mountain and polar regions but throughout the planet.

**Abidjan declaration** was adopted at the Gender Caucus of the 15th session of the Conference of the Parties (COP 15) of the United Nations Convention to Combat Desertification (UNCCD) in 2022 for achieving gender equality for successful land restoration

#### 56. B

**Statements 2 and 3 are correct**

**Statement 1 is incorrect**

*The Living Lands Charter: A Commonwealth Call to action on Living Lands (Commonwealth CALL)* was officially adopted at the **Commonwealth** Heads of Government Meeting in Kigali, Rwanda in June 2022. The member countries have voluntarily agreed to dedicate a '*Living Land*' to future generations in line with the Strategy set for the UN Decade on Ecosystem Restoration and recognise that land resources are under **triple threat** from *climate change, land degradation and biodiversity loss*. The Charter helps member countries to synergise and effectively deliver their commitments under three 'Rio Conventions': the United Nations Framework Convention on Climate Change, the UN Convention on Biodiversity and the UN Convention to Combat Desertification.

#### 57. D

**Both statements are incorrect**

**Global warming potential (GWP)** is the heat absorbed by any greenhouse gas in the atmosphere, as a multiple of the heat that would be absorbed by the same mass of carbon dioxide (CO<sub>2</sub>). GWP for CO<sub>2</sub> is 1. For other gases, it depends on the heat absorbed as well as their lifetime in the atmosphere.

100-year GWP of Methane is 25 while that of SF<sub>6</sub> is 22,800. The **lifetime of Methane** in the atmosphere is *12 years* whereas that of SF<sub>6</sub> is 3,200 years. A large proportion of emissions and the comparative impact of CH<sub>4</sub> being 25 times greater than CO<sub>2</sub> over a 100-year period makes it a potential greenhouse gas.

*Methane Alert and Response System (MARS)*, a new initiative to accelerate the implementation of the Global Methane Pledge by transparently scaling up global efforts to detect and act on major methane emissions sources, was launched by UNEP's International Methane Emissions Observatory at COP27.

#### 58. A

*Navara, Nereguli and Bao-Dhaan* are all traditional paddy varieties.

**Navara** is a GI-tagged rice variety of Kerala with medicinal as well as religious significance.

*Nereguli* is a traditional variety popular among farmers for its flood resistance.

*Bao-dhaan* is iron-rich 'red rice' grown in the Brahmaputra valley of Assam, without the use of any chemical fertilizer.

### 59. C

**Statement 3 is correct.**

**Statements 1 and 2 are incorrect.**

**Precision farming** can be defined as a farm management system that ensures that crops and soil receive exactly what they need for optimum health and productivity, thereby minimising production costs and maximising farm productivity, profitability, and sustainability.

It is heavily dependent on technology, which makes the practice expensive. It **involves deploying an array of advanced tools and technologies** such as field sensors, soil sensors, drones, satellite imagery, GPS, GIS, and IoT devices and leverage deep tech technologies such as data analytics, AI, and ML.

It considers *input aspects* such as soil type, terrain, weather conditions, labour requirements, equipment availability etc. as well as *output data* like that of plant growth and yield data, when managing crops.

Precision farming *does not require complete automation* of all farm operations. Implementation can be done in parts in accordance with the requirements of the farm operations which vary from farm to farm. Precision farming *does not eliminate the need for farmers* instead helps farmers to make the best use of limited resources, adopt sustainable practices, intensify productivity and augment farm income.

### 60. D

**All options are correct.**

**Activated carbon** is carbon produced from carbonaceous source materials such as bamboo, coconut husk, willow peat, wood, coir, lignite, coal, and petroleum pitch, by methods of physical or chemical activation. **Physical activation** involves processes like *Carbonization* and *Oxidation* whereas **Chemical activation** involves impregnation with chemicals like acids, strong bases or salts.

*Applications of Activated carbon-*

Industrial- in metal finishing for purification of electroplating solutions, mercury scrubbing

Medical- **treat poisonings and overdoses** following oral ingestion

Environmental- Spill cleanup, Groundwater remediation, **Drinking water filtration**, Air purification, Volatile organic compounds capture

Agriculture- in livestock production as a pesticide, animal feed additive, processing aid, nonagricultural ingredient and disinfectant and in winemaking as processing agent

Fuel storage- Ongoing research in the **storage of natural gas and hydrogen gas**

**Food additive-** as an additive to impart a "slightly smoky" taste and a dark colouring to products

Skin care- In soaps, scrubs and face masks.

### 61. C

**Statements 2 and 3 are correct**

**Statement 1 is incorrect**

**Sustainable Agriculture** requires that it meets the needs of existing and future generations, while also ensuring *profitability, environmental health* and *social and economic equity*.

In terms of area under the system, **crop rotation** is the most popular sustainable agriculture practice in India followed by **rainwater harvesting** and **mulching**, whereas **intercropping** and **floating farming** have the least area coverage. **Agroforestry** is the system with the largest area



coverage; however, it is mainly popular among large cultivators. *Permaculture* has the least coverage among sustainable agriculture systems. Most SAPSs are being practised by only less than five million (or four per cent) of all farmers.

**National Mission for Sustainable Agriculture (NMSA)** is one of the 8 sub missions under the National Action Plan on Climate Change (NAPCC). It is implemented by the Ministry of Agriculture and Farmers Welfare.

## 62. B

**Statements 2 and 3 are correct**

**Statement 1 is incorrect**

**Biomass Cofiring** is a near-term, low-cost option for efficiently and cleanly converting biomass to electricity by adding *biomass as a partial substitute fuel in high-efficiency coal boilers*. Hence it does not eliminate the need for coal for combustion but reduces it. Cofiring reduces CO<sub>2</sub> emissions, emissions of sulfurous gases like sulfur dioxide as well as that of oxides of nitrogen.

Ministry of Power's policy on "**Biomass Utilization for Power Generation through Cofiring in Coal-based Power Plants**" issued in October 2021 mandates all thermal power plants in the country to use *5 to 10% biomass* along with coal for power production. Ministry of Power has set up **SAMARTH**- Sustainable Agrarian Mission on the use of Agri-Residue in Thermal Power Plants, also regarded as a **National Mission on the use of Biomass in Thermal Power Plants**, with the aim of transforming the problem of stubble burning into a solution of power production with lower carbon footprints in thermal power generation.

## 63. D

**All statements are incorrect**

The *System of Rice Intensification (SRI)* is a methodology for comprehensively managing and conserving resources by changing the way that land, seeds, water, nutrients, and human labour are used to increase productivity from a small but well-tended number of seeds. Unlike the *Direct Seeding of Rice (DSR)* technique where direct seeding is carried out, in SRI 10-12 days old young paddy plants along with soil particles around the root are transplanted in lines. Under SRI 2kg seed is required to grow a nursery for one acre against 5kg seed required in the traditional method.

SRI does not completely avoid the need for artificial irrigation since *intermittent irrigation* is required to keep the soil moist. It also requires frequent inter-cultivation with a weeder.

## 64. A

**Polyethylene Terephthalate (PET)** can be recycled with minimum wastage and maximum financial viability. It is recycled into a wide variety of products like clothes, other textile garments like carpets, construction materials as well as into the same form (PET bottles recycled to PET bottles).

**Polystyrene** is non-recyclable, **Polyvinyl Chloride** cannot be recycled under normal conditions, whereas **Low-density polyethylene** tends to tangle in recycling machinery.

## 65. D

**All statements are correct**

**Namami Gange Programme** is a flagship programme to accomplish the *twin objectives* of effective abatement of pollution and conservation and rejuvenation of the National River Ganga. It is now geared towards *conservation, tourism* and *providing economic livelihoods* in line with '*Arth Ganga*', or harnessing economic potential from the Ganga.

It is one of the 10 ground-breaking efforts from around the globe recognized by the United Nations as “*World Restoration Flagships*” for their role in restoring the natural world.

The programme is being implemented by the **National Mission for Clean Ganga (NMCG)** whose Executive Committee has been authorized to accord approval for all projects up to Rs.1000 crore.

#### 66. D

**Both statements are incorrect.**

The 27th Conference of Parties (CoP) of United Nations Framework Convention on Climate Change (UNFCCC) acknowledged the need for creating a fund for responding to loss and damage focusing on developing countries that are “*particularly vulnerable*” to the adverse effects of the climate change. But the developed countries have not agreed to the liability of historical emissions and have demanded that the fund be outside the UNFCCC to avoid the principle of Common But Differentiated Responsibilities (CBDR). The G7 and a group of climate vulnerable countries Vulnerable 20 (V20) announced the creation of another fund Global Shield Against Climate Risks initiative outside the purview of UNFCCC.

#### 67. C

**Options 1, 3 and 4 are correct.**

The finance mechanism of United Nations Framework Convention on Climate Change (UNFCCC) currently consists of three funds:

- The Green Climate funds
- Global Environment Facility
- The Adaptation Fund

The Resilience and Sustainability Facility was created under the Resilience and Sustainability Trust (RST) of International Monetary Fund to provide policy support and affordable longer-term financing to strengthen members’ resilience and sustainability, and contribute to prospective balance of payments stability.

#### 68. B

**Statement 1 is incorrect.**

**Nagoya protocol** is an international agreement that aims to share the benefits that arise from the utilization of genetic resources fairly and equitably. It is based on the fundamental principles of access and benefit-sharing which involves potential users of genetic resources obtaining the prior informed consent (PIC) of the country in which the genetic resource is located before accessing the resource, and negotiating and agreeing on the terms and conditions of access and use of this resource through the establishment of mutually agreed terms (MAT). The **Cartagena Protocol on Biosafety** to the Convention on Biological Diversity is an international agreement which aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity.

**Statements 2 is correct.**

As per the access and benefit sharing arrangements provided under the UN Convention on Biological Diversity, any foreign individual, institution or company desiring access to biological resources for research, commercial utilisation or biosurvey and bioutilisation is required to seek prior approval in the form of certificates of compliance. These internationally recognized certificates of compliance (IRCCs) indicate that the agreements are in accordance with the Nagoya protocol. The first IRCC was issued by India in 2015 and so far, India has issued 3,136 IRCCs, the most issued by any country.

#### 69. A

The **boreal biome** is characterized by boreal forest and is the world's largest land-based biome. The forest spreads over several continents and covers many countries. Boreal forests are characterized by needle-leaved, drought tolerant, evergreen trees, and a climate consisting of long, cold winters and short, cool summers. The predominant vegetation is an evergreen coniferous forest with species such as spruce, fir and pine. They are characterized by low pH (acidic) soil (podzolic soils) which is due to excessive leaching of alkaline matter which if present would neutralise the organic acids of the accumulating litter.

**70. D**

**All the statements are correct.**

Ethnoveterinary medicines are traditional herbal medicines for animals. Recent researches have established that ethnoveterinary medicines have primarily twin gains: reduction in veterinary visits and reduction in investment on purchase of antibiotics. Both these factors have led to ethnoveterinary being significantly cheaper than antibiotic treatment. The research has also found that ethnoveterinary medicines have high efficacy and a high cure rate (over normal antibiotic treatment).

The Department of Animal Husbandry and Dairying now includes ethnoveterinary medicines in its treatment guidelines for Lumpy Skin Diseases.

**71. D**

**Statements 1 and 3 are correct.**

**Statement 2 is incorrect.**

Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) aims to ensure that international trade (import/export) in specimens of animals and plants included under CITES, does not threaten the survival of the species in the wild. CITES is a legally binding agreement on the Parties, but it does not take the place of national laws. Rather it provides a framework to be respected by each Party, which has to adopt its domestic legislation to ensure that CITES is implemented at the national level.

The export quotas under CITES are usually established by each Party unilaterally and are sometimes also set by the Conference of the Parties. CITES includes both flora and fauna within its ambit but has no fungi on its lists of protected species.

**72. C**

In ecology, **allogenic succession** is succession driven by the abiotic components of an ecosystem. In contrast, **autogenic succession** is driven by the biotic components of the ecosystem. **Hydrarch succession** is a form of plant succession that starts in a shallow water and eventually culminates in a forest. **Xerarch succession** is a form of plant succession, which starts from a very dry place and eventually culminates in the mature forest. **Autotrophic succession** is characterised by early and continued dominance of autotrophic organisms like green plants and begins in predominantly inorganic environment. On the contrary, **heterotrophic succession** is characterised by early dominance of heterotrophs and begins in a predominantly organic environment.

**73. A**

India, at the ongoing 19th Meeting of the Conference of Parties of CITES at Panama City, presented a proposal for uplifting Batagur Kachuga from Appendix II to Appendix I of the CITES. Batagur Kachuga, commonly known as Red-crowned Roofed Turtle (also called Bengal roof turtle), is a species of freshwater turtle native to India and Bangladesh. The turtle is currently on the verge of extinction.

**74. D**

**All the statements are correct.**

The three ecological pyramids that are usually studied are (a) pyramid of number; (b) pyramid of biomass and (c) pyramid of energy.

Ecological pyramid of number is not always upright. It can be upright, partly upright or inverted. (E.g. of partly inverted is: forest ecosystem - In forest ecosystem lesser number of producers support greater number of herbivores who in turn support a fewer number of carnivores.)

Ecological pyramids of biomass is upright in most ecosystem on land but it is generally inverted in aquatic ecosystem. The pyramid of biomass in oceans is inverted because the biomass of fishes far exceeds that of phytoplankton.

Ecological pyramids of energy is always upright because when energy flows some energy is always lost as heat at each trophic level.

There are certain limitations of ecological pyramids such as it does not consider the same species belonging to two or more trophic levels. It assumes a simple food chain, something that almost never exists in nature; it does not accommodate a food web. Moreover, saprophytes are not given any place in ecological pyramids even though they play a vital role in the ecosystem.

**75. C**

**All the statements are correct.**

The Act entrusts the Chief Wildlife Warden to control, manage and maintain all sanctuaries in a state.

The Chief Wildlife Warden is appointed by the state. Under the Act, state governments may declare areas adjacent to national parks and sanctuaries as a conservation reserve, for protecting flora and fauna, and their habitat. The Bill also empowers the central government to notify a conservation reserve.

The 2022 amendment has reduced the number of schedules from six to four. These are:

- Schedule I      Animal species that will enjoy the highest level of protection
- Schedule II     Animal species that will be subject to a lesser degree of protection
- Schedule III    Protected Plant species
- Schedule IV    Specimens listed in the Appendices under CITES (scheduled specimens)

**76. B**

An **ecotype** is a population (or subspecies or race) that is adapted to local environmental conditions.

**Ecocline** is a zone of gradual but continuous change from one ecosystem to another when there is no sharp boundary between the two in terms of species composition. The gradual change in species composition along the environmental gradient as vegetational gradient is called ecocline.

An **ecotone** is a zone of junction or a transition area between two biomes (diverse ecosystems). The mangrove forests represent an ecotone between marine and terrestrial ecosystem.

An **ecological niche** is the role and position a species has in its environment; how it meets its needs for food and shelter, how it survives, and how it reproduces. A species' niche includes all of its interactions with the biotic and abiotic factors of its environment.

**77. B**

**Genetic diversity** indicates a greater number of genetically different individuals within the same species. It is the way by which a population of organisms survives the changing environments. More genetic variation suggests a greater number of individuals with a variety of alleles that help sustain the organisms in the changing environment.

**Species diversity** is defined as the number of species and population of species that live in that particular environment. Each species has a crucial role in ecosystem management and a high species diversity contributes to a healthy ecosystem. Higher species diversity can lead to increased ecosystem productivity by exploiting available resources efficiently and it will lead to a more stable ecosystem.

**Ecological diversity** is the largest scale of biodiversity and refers to the variation in ecosystems within a given geographic area.

**78. D**

**All options are correct.**

The Tharu tribe is mainly found in Nepal, with a small population inhabiting the Dudhwa National park fringes who have contributed significantly to the conservation of tigers in the area.

Baiga tribe sees the tiger as a companion with whom they share the forest. They have been part of the tiger conservation in the Achanakmar tiger reserve among various other places.

The Chenchu tribe worship the tiger, considering it both a god and a member of their large spiritual family, which includes other animals such as panthers and bears. The forest department has been empowering the local community of Chenchu for tiger protection in Amrabad Tiger reserve.

**79. A**

**Animal Welfare Board of India** is a statutory body set up in 1962, in accordance with Section 4 of the Prevention of Cruelty to Animals Acts 1960.

**Central Pollution Control Board** was established in 1974 under the Water (Prevention and Control of Pollution) Act and later entrusted with functions and responsibilities under the Air (Prevention and Control of Pollution) Act, 1981.

The **Genetic Engineering Appraisal Committee** (GEAC) is the statutory committee constituted under the “Rules for the Manufacture, Use/Import/Export and Storage of Hazardous Micro Organisms/Genetically Engineered Organisms or Cells (Rules, 1989)” framed under Environment (Protection) Act, 1986.

The **National Biodiversity Authority** (NBA) was established in 2003 by the Central Government to implement India’s Biological Diversity Act (2002).

The **National Green Tribunal** is a specialised judicial body established in 2010, as per the National Green Tribunal Act, 2010 for the purpose of adjudicating environmental cases in the country.

#### 80. D

**All the statements are correct.**

The **Biological Diversity Act, 2002** was born out of India’s attempt to realise the objectives enshrined in the United Nations Convention on Biological Diversity (CBD) 1992. It aims at the conservation of biological resources, managing its sustainable use and enabling fair and equitable sharing benefits arising out of the use and knowledge of biological resources with the local communities.

The Act does not aim at banning the use of medicinal plants by vaid and hakims and for traditional practices. They will continue to have free access to resources and knowledge. An explicit provision to this effect has been made under Section 7 of Biological Diversity Act 2002.

The Act envisaged a three-tier structure to regulate the access to biological resources:

- The National Biodiversity Authority (NBA)
- The State Biodiversity Boards (SBBs)
- The Biodiversity Management Committees (BMCs) (at local level)

The act stipulates all offences under it as cognizable and non-bailable. Any grievances related to the determination of benefit sharing or order of the National Biodiversity Authority or a State Biodiversity Board under this Act, shall be taken to the National Green Tribunal (NGT).

#### 81. A

**Statement 3 is incorrect.**

**Statements 1 and 2 are correct.**

Losar the Ladakhi New year falls about the time of the winter solstice any time between 8th and 30th December. The celebrations usually begin with a Metho ceremony with a procession of people chanting prayers and carrying flame torches. It is believed to cleanse the evil spirits and the negativity that was accumulated in the entire year.

Bohag Bihu literally means 'spring', Bohag Bihu is the most important festival in Assam and occurs three times a year. In April, it is called Rongali or Bohag Bihu, in October November Kati Bihu, and in January, coinciding with Makara Sankranti, it is called Bhogali Bihu.

Of this Bohag Bihu is celebrated for three days and ushers in the New Year for the Assamese people.

#### 82. D

**All statements are correct**

The Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act, 2001 provides for three types of rights:

**Breeders’ Rights:** Breeders will have exclusive rights to produce, sell, market, distribute, import or export the protected variety. Breeder can appoint agent/ licensee and may exercise for civil remedy in case of infringement of rights.

**Researchers’ Rights:** Researcher can use any of the registered variety under the Act for conducting experiment or research.

**Farmers’ Rights:** A farmer who has evolved or developed a new variety is entitled for registration and protection in like manner as a breeder of a variety. A farmer can save, use, sow, re-sow, exchange, share or sell his farm produce including seed of a variety protected under the PPV&FR Act, 2001, provided farmer shall not be entitled to sell branded seed of a variety protected under the PPV&FR Act, 2001

The duration of protection of registered varieties is different for different type of crops which are as below:

- Trees and vines - 18 years.
- For other crops - 15 years.

### 83. B

The Indian Navy currently operates diesel powered submarines. India's submarine fleet is based at two locations: Visakhapatnam on the east coast and Mumbai on the west coast.

Scorpene is a conventional submarine designed by the France Naval Group for the export market. Under Project 75 these submarines are designed by French naval shipbuilder Naval Group and are being manufactured by Mazagon Dock Limited in Mumbai. They have superior stealth features like advanced acoustic absorption techniques and low radiated noise levels.

Under project 75, six Kalvari class scorpene submarines have been built. INS Kalvari, INS Vela, INS Karanj, INS Khanderi has been commissioned. INS Vagir has now completed the sea trials and going to be commissioned soon. INS Vagsheer is now undergoing sea trials and will be inducted in coming years.

### 84. C

Ministry of Electronics and Information Technology is the nodal ministry regulating online gaming. This will provide clarity and certainty to investors, industry and consumers.

### 85. D

**All pairs are rightly matched**

During the last seven years, four Greenfield airports namely, Kannur in Kerala, Shirdi in Maharashtra, Kushinagar in Uttar Pradesh, and Mopa in Goa have been constructed as international airports. In addition, two existing airports namely, Vijayawada and Tirupati in Andhra Pradesh were declared as international airports in the year 2017.

### 86. A

**Statements 1 and 3 are correct**

**Statement 2 is incorrect**

India Semiconductor Mission (ISM) as an Independent Business Division within Digital India Corporation they have administrative and financial autonomy to drive India's strategies for developing semiconductors and display manufacturing ecosystem.

ISM will be headed by a Chief Executive Officer (CEO). The key management personnel i.e., Chief Executive Officer (CEO), Additional Chief Executive Officer, a Chief Technology Officer (CTO), Chief Strategy Officer (CSO), Chief Financial Officer (CFO). Chief Business Development Officer (CBDO), etc. shall be selected inter-alia from industry.

Functions of ISM:

- Advise the Government of India on matters related to semiconductor and display ecosystem development
- Act as the first reference point for any investor interested in setting up a semiconductor or display manufacturing facility in India.
- Implement schemes
- Fund commercial/research projects and Centres of Excellence for the development of the semiconductor and display ecosystem

### 87. B

**Statements 2 and 3 are correct****Statement 1 is incorrect**

New Delhi international Arbitration Centre Act 2019 empowers the union government to create the New Delhi international Arbitration Centre as a body corporate. Recently an amendment to the act renamed it as India International Arbitration Centre. It is a seven-member body to be headed by a former Judge of Supreme Court or a High Court or an eminent person. It has been declared to be an institution of national importance. It will provide cost effective and timely services for the conduct of arbitration and conciliation at national and international level, facilitate conduct of international and domestic arbitration and conciliation and impart training in alternative dispute resolution and related matters in field of arbitration, conciliation and mediation.

**88. C**

Air Suvidha is a self-declaration form meant to be filled out by international arrivals. Here, the air passengers self-declare their details like vaccination status, travel information of the last 14 days, recent RT-PCR test report, passport number, and Email ID. Submitting the Air Suvidha form will help prevent the spread of the virus by facilitating contact tracing.

**89. A****Statements 1 and 2 are correct****Statement 3 is incorrect**

Earlier, as per the Motor Vehicle Act, 1988, the owners were only allowed to keep their vehicle in another state (different from the ones they are registered in) for 12 months. After this period, the vehicle's registration was supposed to be transferred from the parent to the new state. The vehicle registered with a BH series doesn't require any transfer registration every time the owner moves. The number plate remains valid throughout the country.

The BH series number plates will start with two numbers showing the year of first registration, followed by BH representing 'Bharat'. Later on, there are four randomly generated numbers on the number plate anywhere from 0000 to 9999, followed by two letters using all combinations 'AA' to 'ZZ'.

This vehicle registration facility under 'Bharat series (BH series)' will be available on a voluntary basis to defence personnel, employees of central government/ state government/ central/ state public sector undertakings and **private sector companies/ organisations**, which have their offices in four or more states/Union territories. The BH series is applicable only for non-transport vehicles.

**90. D**

The experiment referred is **CAPSTONE**. A microwave oven-sized CubeSat weighing just 55 pounds will serve as the first spacecraft to test this unique, elliptical lunar orbit as part of the Cislunar Autonomous Positioning System Technology Operations and Navigation Experiment (**CAPSTONE**). As a pathfinder for **Gateway**, a Moon-orbiting outpost that is part of NASA's **Artemis program**, CAPSTONE will help reduce risk for future spacecraft by validating innovative navigation technologies and verifying the dynamics of this halo-shaped orbit.

The orbit, formally known as a near rectilinear halo orbit (NRHO), is significantly elongated. Its location at a precise balance point in the gravities of Earth and the Moon, offers stability for long-term missions like Gateway and requires minimal energy to maintain.

The **Quesst mission** has two goals: 1) design and build NASA's X-59 research aircraft with technology that reduces the loudness of a sonic boom to a gentle thump to people on the ground; and 2) fly the X-59 over select U.S. communities to gather data on human responses

to the sound generated during supersonic flight and deliver that data set to U.S. and international regulators.

**DAVINCI+** (Deep Atmosphere Venus Investigation of Noble gases, Chemistry and Imaging Plus) would analyze the atmosphere of Venus to see how it was formed and evolved, and whether the planet ever had an ocean. **VERITAS** (Venus Emissivity, Radio Science, InSAR, Topography and Spectroscopy) would map Venus' surface to check out its geological history.

### 91. A

**Statements 2 and 3 are incorrect**

**Statement 1 is correct**

Social Progress Index (SPI) for States and Districts is prepared by the Institute for Competitiveness and Social Progress Imperative. The index assesses states and districts based on 12 components across three critical dimensions of social progress - Basic Human Needs, Foundations of Wellbeing, and Opportunity.

Puducherry has the highest SPI score of 65.99 in the country and tops the list. Kerala is ranked 9 in the list.

### 92. B

**Statements 1 and 3 are incorrect.**

**Statement 2 is correct.**

Central Government has enacted the Gram Nyayalayas Act, 2008 to provide access to justice to the citizen at their door steps. It provides for establishment of Gram Nyayalayas at intermediate panchayat level. In terms of Section 3 (1) of the Gram Nyayalayas Act, 2008, the State Governments are responsible for establishing Gram Nyayalayas in consultation with the respective High Courts. However, *setting up of Gram Nyayalayas are not mandatory as per the act.*

Gram Nyayalayas is deemed to be a Court of Judicial Magistrate of First Class with both civil and criminal jurisdiction to settle petty disputes at the village level.

The appeal in civil matters shall lie to the District Court, which shall be heard and disposed of within six months from the date of filing of the appeal. In criminal proceedings, an appeal must be filed with the Court of Session, which must hear and decide the case within six months of the date of filing.

### 93. A

**Statement 1 is correct.**

**Statement 2 is incorrect.**

The 'Indian Biological Data Centre (IBDC)' is the first national repository for life science data in India. IBDC is mandated to archive all life science data generated from publicly funded research in India. The data centre is supported by the Government of India (GOI) through the Department of Biotechnology (DBT). It is being established at the Regional Centre of Biotechnology (RCB), Faridabad in the national capital region in collaboration with the National Informatics Centre (NIC), India.

IBDC would have majorly two data access types:

- **Open access/time-release access:** Data submitted at IBDC would be *freely accessible* across the globe as per international open-access standards. The submitter, however, may choose to restrict the data access for a defined period of time.
- **Restricted access:** The data would *not be made accessible freely*. It can only be accessed through prior permission through IBDC from the original



data submitter. In general, the data submitter would have the choice to opt for a particular access mode at the time of submission.

**94. B**

The defence exercise mentioned is Sea Vigil. This exercise will be undertaken along the 7,516 km coastline of the country, covering the Exclusive Economic Zone (EEZ) of India.

This exercise is a build-up towards the major Theatre Level Readiness Operational Exercise (TROPEX), which is conducted by the Indian Navy every two years.

**95. C**

**Both statements are correct.**

Ministry of Power has notified Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022 in order to further accelerate our ambitious renewable energy programmes, with the objective of ensuring access to affordable, reliable, sustainable and green energy for all.

*Consumers with 100Kw or above sanctioned load* can get renewable energy through open access portal from any renewable energy generating plant set up by himself or by any developer.

**96. C**

**Both the statements are incorrect.**

The Association of Southeast Asian Nations, or ASEAN, was established on 8 August 1967 in Bangkok, Thailand, with the signing of the ASEAN Declaration (**Bangkok Declaration**) by the Founding Fathers of ASEAN: Indonesia, Malaysia, Philippines, Singapore and Thailand. Brunei Darussalam joined ASEAN on 7 January 1984, followed by Vietnam on 28 July 1995, Lao PDR and Myanmar on 23 July 1997, and Cambodia on 30 April 1999, making up what is today the ten Member States of ASEAN.

India has 2+2 dialogues with four key strategic partners: the US, Australia, Japan, and Russia.

**97. C**

**Both statements are correct**

Artemis I is an uncrewed flight test that provide a foundation for human deep space exploration and demonstrate the commitment and capability to extend human existence to the Moon and beyond. During this flight, the spacecraft was launched on the most powerful rocket in the world (Space Launch System (SLS)) and fly farther than any spacecraft (Orion) built for humans has ever flown. Artemis 1 spend a total of 25.5 days in space and travelled 1.4 million miles (2.3 million kilometers).

**98. C**

**Only three pairs are correctly matched.**

The Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS) report was released by the *World Health Organization (WHO) and UN-Water*.

**99. B**

Brazil, Indonesia and the Democratic Republic of Congo, the world's three biggest rainforest nations, launched a formal partnership on forest conservation at a side event of the 27th Conference of the Parties to the UN Framework Convention on Climate Change. The countries have pledged to work together on environmental compensation from develop which

is necessary for the forest conservation. The three countries represent 52 per cent of the world's tropical rainforest.

**100. A**

**Statements 1 and 2 are incorrect.**

**Statement 3 is correct.**

The G20 *was founded in 1999 after the Asian financial crisis* as a forum for the Finance Ministers and Central Bank Governors to discuss global economic and financial issues.

The G20 was upgraded to the level of Heads of State/Government in the wake of the global economic and financial crisis of 2007, and, in 2009, was designated the “premier forum for international economic cooperation”.

The G20 consists of two parallel tracks: the Finance Track and the Sherpa Track. Finance Ministers and Central Bank Governors lead the Finance Track while Sherpas lead the Sherpa Track after Finance Track.

The Group does not have a permanent secretariat. The Presidency is supported by the *Troika* – *previous, current and incoming Presidency*. During India’s Presidency, the troika will comprise *Indonesia, India and Brazil, respectively*.

*South Africa is the only African member* in G20.

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