

Q.1)

**Exp) Option b is the correct answer.**

The Green Credit Programme (GCP) is an innovative market-based mechanism designed to incentivize voluntary environmental actions across diverse sectors, by various stakeholders like individuals, communities, private sector industries, and companies.

**Statement 1 is incorrect: The GCP does not rank Indian financial institutions based on their credit portfolios for promoting environmentally sustainable activities.** The Green Credit Program (GCP) seeks to **encourage environmentally friendly practices** rooted in tradition and conservation such as the afforestation activities, water conservation, soil improvements etc.

**Statement 2 is correct: The Indian Council of Forestry Research and Education (ICFRE) serves as the GCP administrator and responsible for its implementation,** management, monitoring, and operation. The ICFRE is an autonomous organization functioning under the Ministry of Environment, Forest and Climate Change (MoEFCC).

Q.7)

**Exp) Option a is the correct answer.**

GCF is the world's largest climate fund dedicated to fight climate change and mandated to support developing countries raise and realize their Nationally Determined Contributions (NDC) ambitions towards low-emissions, climate-resilient pathways.

**Statement 1 is incorrect:** GCF was established under the **Cancún Agreements of COP-16 of UNFCCC held at Cancun in 2010**, as a dedicated financing vehicle for developing countries within the global climate architecture, serving the Financial Mechanism of the UNFCCC and the Paris Agreement.

**Statement 2 is incorrect:** The GCF is headquartered in **Songdo, Incheon City, Republic of Korea**, since December 2013.

**Statement 3 is correct:** GCF is mandated to invest 50% of its resources to mitigation and 50% to adaptation in grant equivalent. At least half of its adaptation resources must be invested in the most climate vulnerable countries (SIDS, LDCs, and African States). The GCF programming strategy recognizes that we must scale up both mitigation and adaptation efforts.

Knowledge Base: GCF operates through a network of over 200 Accredited Entities and delivery partners who work directly with developing countries for project design and implementation. Its partners include international and national commercial banks, multilateral, regional and national development finance institutions, equity funds institutions, United Nations agencies, and civil society organizations.

GCF also serves as the formal financial mechanism for the **Paris Agreement**

Q.8)

**Exp) option c is the correct answer.**

The Perform Achieve and Trade (PAT) scheme is a flagship programme under **National Mission for Enhanced Energy Efficiency (NMEEE)**. PAT scheme is based on market mechanism to enhance the cost effectiveness through certification of excess energy saving which can be traded. The excess energy savings are converted into tradable instruments called Energy Saving Certificates (ESCCerts) that are traded at the Power Exchanges. The two Power Exchanges such as India Energy Exchange (IEX) and Power Exchange India Limited (PXIL) provide the trading platform where the Designated Consumers (DCs) who fall short of their compliance, bid for purchase of ESCerts

**Statement 1 is correct:** Perform, Achieve and Trade (PAT) is a regulatory instrument to reduce Specific Energy Consumption (SEC) in energy intensive industries, with an associated market based mechanism to enhance the cost effectiveness through certification of excess energy saving which can be traded. PAT is a mechanism designed to achieve the required energy efficiency in energy intensive sectors. Energy

consumption norms and standards are set by the BEE for intensive industry sectors. Selected industries from energy intensive sectors based on specified threshold levels are identified as Designated Consumers (DCs) within certain key sectors and are required to comply with the notified norms, rules and regulations framed under Energy Conservation (EC) Act, 2001.

**Statement 2 is correct:** The trading of energy saving certificates (ESCs) is central to the PAT programme and serves as an incentive to reach or surpass the mandatory targets. **The ESCs, equivalent to 1 tonne of oil equivalent (toe) of energy savings, are given based on quantified energy savings verified by an accredited energy auditor.** The ESCs are **awarded after a Designated Consumer (D.C.) surpasses its target and can then be sold to another Designated Consumer (D.C.) that has failed to achieve its target**, the price for which is determined through market supply and demand. The ESCs can also be banked for next PAT cycles of the respective DC to contribute towards meeting future targets as the PAT programme expands. **The Central Electricity Regulatory Commission acts as the market regulator by defining the regulatory framework for trading of the ESCs, while the Power System Operation Corporation is responsible for the centralized ESC registry.** The **Bureau of Energy Efficiency is the administrator and developed a platform to manage the ESC trading process.** ESCs are to be **traded only on electricity exchanges such as IEX and PXIL.** Hence starting with April 2017, the Indian Energy Exchange and the Power Exchange of India are managing ESC trading.

**Statement 3 is correct:** Central Electricity Regulatory Commission (CERC) is the designated market regulator for trading of ESCs, under the PAT scheme.

Q.9)

**Exp) Option c is the correct answer.**

Solar radiation modification (SRM) is a type of climate engineering that aims to reduce global warming by reflecting more sunlight back to space or allowing more infrared radiation to escape from Earth.

**Option 1 is correct:** Seeding the sea with **iron technique involves adding iron to the ocean to stimulate the growth of phytoplankton.** **Phytoplankton**, a microscopic algae that use photosynthesis to convert carbon dioxide into organic matter. By increasing the amount of phytoplankton, more carbon dioxide could be removed from the atmosphere and stored in the ocean, reducing the greenhouse effect and global warming.

**Option 2 is correct:** **Marine cloud whitening** technique involves spraying tiny particles, such as sea salt or sulfur, into low-level clouds over the oceans. It is done **to increase their reflectivity and albedo** (fraction of incoming solar radiation that is reflected back to space). By making the clouds brighter, more sunlight could be reflected away from the Earth, reducing the amount of solar energy absorbed by the surface and the atmosphere, and thus cooling the planet.

**Option 3 is correct:** Stratospheric injection of sulfur dioxide technique involves injecting **sulfur dioxide or other aerosols into the stratosphere**, to create a thin layer of particles that would scatter and reflect some of the incoming solar radiation. This would mimic the cooling effect of large volcanic eruptions, such as the 1991 eruption of Mount Pinatubo in Philippines, which lowered the global temperature by about 0.5 °C (0.9 °F) for several months.

Q.13)

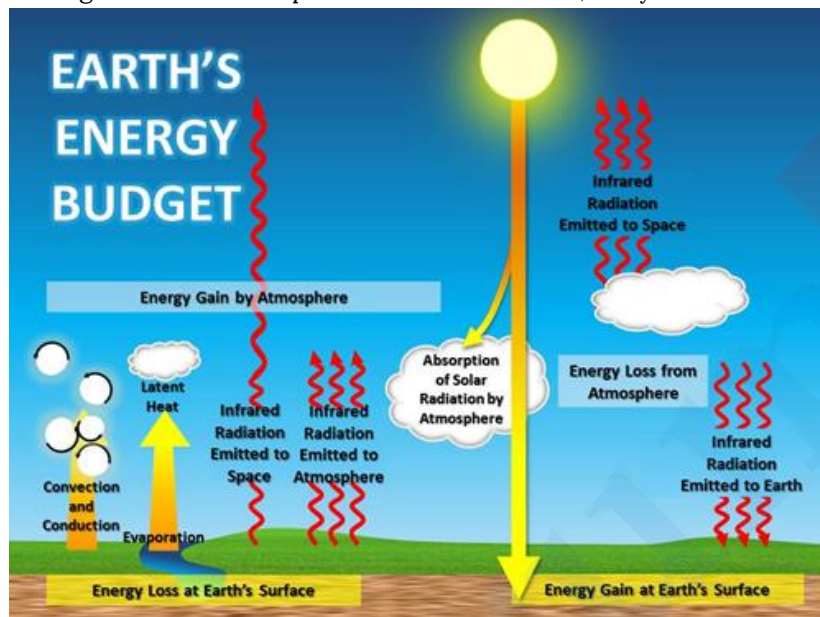
**Exp) Option b is the correct answer.**

Earth absorbs energy from the sun, and eventually emit an equal amount of energy to space. The **difference between incoming and outgoing radiation is known as a planet's radiative forcing (RF) or Climate Forcing.** Climate Forcing are factors in the climate system that either increase or decrease the effect of the climate system.

**Statement 1 is correct.** Climate Forcing is an indicator of Climate Change that measures the “radiative forcing” or heating effect caused by greenhouse gases in the atmosphere. It is a destabilizing influence caused by any changes to the Earth’s climate system that affect how much energy enters or leaves the system alters Earth’s radiative equilibrium and can force temperatures to rise or fall.

**Statement 2 is incorrect.** Positive climate forcings such as excess greenhouse gases warm the earth while negative climate forcings, such as the effects of most aerosols and volcanic eruptions, cool the earth.

**Statement 3 is correct.** Volcanic eruptions, changes in the Sun’s radiative output, and the mostly anthropogenic changes in greenhouse gases, tropospheric aerosols, and land use are the main climate forcings for surface temperatures over the last 2,000 years.



Q.14)

Exp) Option b is the correct answer.

Polar stratospheric clouds (PSCs) called as “**Mother of Pearl**” by Scandinavians are opalescent clouds that are found only in the polar regions, where stratospheric temperatures fall below about  $-70^{\circ}\text{C}$ , cold enough to initiate their formation.

**Statement 1 is correct.** During the winter, the high latitudes receive very little to no solar radiation, so temperatures drop significantly during this period, known as **polar night**. Under these conditions, PSCs can develop. They **trap outgoing longwave radiation (OLR)** and emit some of it back towards the Earth's surface, so they **hinder atmospheric cooling**. This change would cause **warming in the high-latitudes** as longwave radiation would not be able to escape the Earth's atmosphere as easily.

**Statement 2 is incorrect.** Polar stratospheric clouds provide a surface which converts benign forms of chlorine into reactive, ozone-destroying forms, and they **remove nitrogen compounds** that **moderate the destructive impact of chlorine**. Hence the gravitational sedimentation of large PSC particles acts to remove reactive nitrogen (a process called “**denitrification**”), which can then **no longer deactivate** the chlorine, thus prolonging the ozone destruction cycle.

**Statement 3 is correct.** The ice particles of the **Polar stratospheric clouds** provided substrates (a **surface on which other chemical reactions are performed**) for chemical reactions which freed chlorine from its reservoirs. Reactions on **Polar stratospheric clouds** cause the highly reactive chlorine gas to be formed, which is very effective in the chemical destruction of ozone at South Pole.

Q.16)

**Exp) Option a is the correct answer.**

Mission 'Lifestyle for Environment' (LiFE) seeks to replace the prevailing 'use-and-dispose' economy, characterized by thoughtless and harmful consumption, with a circular economy marked by mindful and intentional utilization.

**Statement 1 is incorrect:** The Mission LiFE is a global mass movement, launched by the Indian Prime Minister during the 26th United Nations Climate Change Conference of the Parties (COP26) in Glasgow in 2021 (not during the 2022 G20 Bali summit). The mission aims to encourage individuals to adopt simple daily actions that can significantly contribute to addressing climate change globally.

**Statement 2 is incorrect:** The mission aims to establish a global network of individuals, termed Pro-Planet People (P3), who share a commitment to embracing and promoting environmentally friendly lifestyles. P3 is not a status accorded to certain financial institutions to channelize more funds into sustainable economic activities.

**Statement 3 is correct:** Mission LiFE promotes the consumption of millets, which are nutritious and climate-friendly grains, through various government schemes like Anganwadi, Mid-Day Meal, and Public Distribution System

Q.19)

**Exp) Option b is the correct answer**

Option a is incorrect. Anamudi peak is located on the border of the 2 districts; Idukki and Ernakulam are the most famous and one of the highest peaks in Kerala. The name in Malayalam is known as the elephant's hair. As a matter of fact, this is the highest peak in southern India. This is a mountain with an elevation of 2695 meters and is 8841 ft. above the sea level. This is one magnificent mountain that is seen in the Kerala state that is very picturesque and beautiful. The magnificent beauty of a mountain has smooth slopes on the northern and the southern skies while the eastern and the western end is rocky and rugged. Located in the southern region of the Eravikulam national park in Munnar, this is certainly one of the highest peaks in Kerala.

Option b is correct. Agasthyakoodam is nature's ode to bird watchers. One of the highest peaks in Kerala, it has long been known as a bird watcher's paradise and many gather here to catch sight of exotic avian species. It can be viewed from near Neyyar Dam as well as Bonacaud. Agasthyakoodam is also known for its remarkable flora and fauna, especially certain rare medicinal herbs which have been discovered here. Over 2000 species including lichens, orchids, mosses and ferns have been recorded in the area.

The peak was named after the sage Agasthya and is a popular pilgrim site. A shrine dedicated to him is located here and is frequented by devotees. The air itself is said to have medicinal qualities. The peak is a 90 minute drive with Bonacaud being the last motor able spot. Trekking is restricted as only a few people are allowed to go up the peak. One must get a forest pass from the wildlife office in Thiruvananthapuram with January to April being the recommended months.

Option c is incorrect. Mookuthi Mala peak is Located in the hill district of Wayanad. This peak is at the altitude of 2554 meters which is 8380 feet above sea level. Dotted with many tea plantations, spice plantations and coffee plantations on the rolling landscape give you a very pleasant smell throughout and you will certainly be refreshed and rejuvenated. This is certainly one of the highest peaks in Kerala.

Option d is incorrect. Pambadum Shola is Known for having one of the highest peaks in the Kerala state. Idukki district is also the place where you will find Pambadum Shola. This is one mountain peak which will offer magnificent experience and breath-taking views of the whole lush green surrounding. This place is very famous for its medicinal herbs and is also one of the smallest wildlife sanctuaries in the Idukki district. Literally meaning, "The hill where the snakes dance", Pambadum Shola is a magnificent beauty in itself with much-varied wildlife.

Q.22)

**Exp) Option c is the correct answer.**

“**Loss and damage**” is a general term used in UN climate negotiations to refer to the **consequences of climate change that go beyond what people can adapt to**, or when options exist but a community doesn't have the resources to access or utilize them. In simple terms, Loss and Damage refer to the **adverse impacts and harm resulting from the failure to adequately mitigate and adapt to changing climate conditions**. This could include the loss of coastal heritage sites due to rising sea levels, or the loss of homes and lives during extreme floods.

**COP28 Summit 2023, Dubai** adopted the decision on the **operationalization of the Loss and Damage Fund**. The purpose of the Fund is to assist developing countries that are particularly vulnerable to the adverse effects of climate change in responding to economic and non-economic loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events.

Q.23)

**Exp) Option b is the correct answer.**

Methane is a powerful greenhouse gas that contributes to climate change and has many sources, such as fossil fuels, agriculture, and waste. Reducing methane emissions can have immediate and significant benefits for the climate, human health, and food security.

**Statement 1 is correct:** The Global Methane Pledge was launched at **COP26** (COP26 is the 26th United Nations Climate Change Conference, held in Glasgow, Scotland, from 31 October to 13 November 2021) **by the European Union and the United States**, and has been joined by over 150 countries.

**Statement 2 is correct:** The Global Methane Pledge aims to reduce global methane emissions by at **least 30 percent from 2020 levels by 2030**. It has over 150 country participants who together are responsible for 50% of global human-caused methane emissions.

**Statement 3 is incorrect:** India, the third-largest source of methane emissions, is **not a signatory of the Global Methane Pledge**. According to the Ministry of Environment, Forests and Climate Change, in reply to a Parliament question for not joining the pledge explained that this pledge shifts the CO<sub>2</sub> reduction burden to methane reduction, which has a lifetime of just 12 years. As this is against the 6th Assessment Report of the Intergovernmental Panel on Climate Change, which states that the predominant gas responsible for climate change is CO<sub>2</sub> which has a lifetime of 100-1,000 years.

Q.27)

**Exp) Option b is the correct answer.**

According to German watch's 2020 findings, India is the seventh-most vulnerable country with respect to climate extremes. CEWW, hence released a Climate Vulnerability Index by studying exposure, sensitivity and adaptive capacity. Findings of the reports are:

**Statement 1 is incorrect** - Environmental think tank Council on Energy, Environment and Water (CEWW) and not NITI Aayog has carried a first-of-its-kind district-level climate vulnerability assessment, or Climate Vulnerability Index (CVI). The index has analysed 640 districts in India and found that 463 of these are vulnerable to extreme floods, droughts and cyclones.

**Statement 2 is correct** - According to the report, more than 80% of Indians live in districts vulnerable to climate risks. 17 of 20 people in the country are vulnerable to climate risks, out of which every five Indians live in areas that are extremely vulnerable. More than 45% of these districts have undergone “unsustainable landscape and infrastructure changes”.

**Statement 3 is correct** - The southern zone of India is the most vulnerable to extreme climate events and their compounding impacts, followed by the eastern, western, northern, north-eastern and central zones.

59 and 41 per cent of the total districts in the eastern and western zones of India are highly vulnerable to extreme cyclone events. Five out of six zones in India, i.e., South, North, North-East, West and Central have a low adaptive capacity to extreme hydro-met disasters. However, the Eastern Zone has a medium-range adaptive capacity to extreme hydro met disasters.

Q.35)

**Exp) Option a is the correct answer**

ECBC was launched in May 2007, as the first step towards promoting energy efficiency in the commercial building sector. It sets minimum energy standards for new commercial buildings having a connected load of 100 kW or contract demand of 120 kVA or more.

**Statement 1 is incorrect:** The ECBC is a flagship programme of the **Bureau of Energy Efficiency (BEE)**, which comes under the administrative control of the **Ministry of Power**.

**Statement 2 is incorrect:** In order for a building to be considered ECBC-compliant, it would need to demonstrate minimum energy savings of 25%. Additional improvements in energy efficiency performance would enable the new buildings to achieve higher grades like ECBC Plus or Super ECBC status leading to further energy savings of 35% and 50%, respectively.

**Statement 3 is correct:** In India, the ECBC have been formulated for both- the commercial as well as residential buildings.

**For commercial buildings:** It was launched in 2017 titled as the 'Energy Conservation Building Code' This sets minimum energy standards for new commercial buildings.

**For residential buildings:** BEE also launched an Energy Conservation Building Code for residential buildings. It is known as, '**Eco Niwas Samhita 2018**'

Knowledge Base:

**BEE:** It is a **Statutory body** established in March 2002, under the provisions of the Energy Conservation act 2001. It comes under the administrative control of the Ministry of Power.

**ECO NIWAS SAMHITA:** Ministry of Power launched the Energy Conservation- New Indian Way for Affordable & Sustainable Homes (ECO Niwas) Samhita 2018, an Energy Conservation Building Code For Residential Buildings (ECBC-R) to give a further fillip to India's energy conservation efforts.

**ECBC 2017:** Updated version of ECBC was launched in 2017, which had additional priorities of renewable energy integration, ease of compliance, inclusion of passive building design strategies and flexibility for the designers.

ECBC 2017 is one of the first building energy codes to recognize beyond code performance.

Q.36)

**Exp) Option d is the correct answer.**

Carbon fertilization, also known as the carbon dioxide fertilization effect, is the phenomenon where increased levels of atmospheric carbon dioxide (CO<sub>2</sub>) enhance the growth and productivity of plants. This effect occurs because plants use CO<sub>2</sub> during photosynthesis to produce energy, and higher concentrations of CO<sub>2</sub> can potentially stimulate plant growth and increase crop yields. However, the extent to which this effect occurs and its long-term implications for ecosystems and agriculture are subjects of ongoing research and debate.

**Option a is incorrect:** Increased temperature of Earth due to increased concentration of carbon dioxide and other greenhouse gases in the atmosphere, refers to **Global Warming**.

**Option b is incorrect:** **Ocean acidification** refers to reduction in the pH and thereby increase in the acidity of the ocean over an extended period of time, caused primarily by uptake of carbon dioxide (CO<sub>2</sub>) from the atmosphere.

**Option c is incorrect:** Carbon sequestration is the capturing, removal and storage of carbon dioxide (CO<sub>2</sub>) from the earth's atmosphere and storing it in plants, soil, etc. . **It is of two types;**

**Biological carbon sequestration (BCS);** In BCS carbon is stored in the natural environment. This includes what are known as 'carbon sinks', such as forests, grasslands, soil, oceans and other bodies of water. This is also known as an 'indirect' or passive form of sequestration.

**Geological carbon sequestration (GCS);** In GCS Under this carbon is stored in places such as underground geological formations or rocks. This process is largely artificial or 'direct'

**Option d is correct** Increased photosynthesis and growth of plants due to the increase in concentration of carbon dioxide (CO<sub>2</sub>) in the atmosphere, this phenomenon is termed Carbon Fertilization or Carbon Dioxide fertilization effect.

Knowledge Base: The carbon fertilization effect has been reported to be the cause of 44% of Gross primary productivity (GPP) increase since the 2000s.

Studies have shown that Carbon Fertilization causes various advantages like: increased plant growth, improved agricultural productivity, enhanced carbon sequestration, etc.

However, it can also negatively affect the nutrient availability, ecosystem dynamic and long- term sustainability of agricultural systems.

**Q.38)**

**Exp) Option d is correct.**

The Earth faces a looming crisis. Globally, temperatures are rising. Heat waves, droughts, ocean acidification, and rising sea levels are on the horizon. Around 90% of the world lives in the northern hemisphere with major population centres in the tropical and subtropical regions. These regions will be severely affected. Scientists are also concerned about the unforeseen problems that can emerge from **thawing of permafrost and glacial ice.**

**Statement 1 is correct. Permafrost is a ground that remains at or below 0°C for two or more years.** It underlies about a fifth of the land surface of the Earth. Permafrost terrain consists of an active layer at the surface that freezes and thaws each year, underlain by perennially frozen ground. The top of permafrost is at the base of the active layer, and the base of permafrost occurs where the ground temperature rises above 0°C at depth.

**Statement 2 is correct.** These permanently frozen grounds (Permafrost's) are most common in regions with **high mountains** and in **Earth's higher latitudes near the North and South Poles.** Permafrost can be found on land and below the ocean floor. It is found in areas where temperatures rarely rise above freezing. This means permafrost is often found in Arctic regions such as Greenland, the U.S. state of Alaska, Russia, China, and Eastern Europe.

**Statement 3 is correct.** Permafrost covers large regions of the Earth. Almost a quarter of the land area in the Northern Hemisphere has permafrost underneath. Although the ground is frozen, **permafrost regions are not always covered in snow.**

**Statement 4 is correct.** Permafrost is a permanently frozen layer on or under Earth's surface. It consists **of soil, gravel, and sand, usually bound together by ice.** Permafrost usually remains at or below 0°C for at least **two years.** Permafrost can be found **on land and below the ocean floor.** It is found in areas where temperatures rarely rise above freezing. This means permafrost is often found in Arctic regions such as Greenland, the U.S. state of Alaska, Russia, China, and Eastern Europe.

**Q.45)**

**Exp) Option d is the correct answer.**

**The Global Stocktake, proposed as a five-yearly review of countries' actions to mitigate climate change,** serves as a crucial element under the **Paris Agreement.** This agreement mandates that each

country present a climate action plan in five-year cycles, with the first global stocktake scheduled for 2023.

**Option d is correct: The Global Stocktake contributes to actions to mitigate climate change by conducting periodic assessments every five years.** This assessment is vital for evaluating the global progress toward climate goals. By examining the cumulative impact of climate actions, the Global Stocktake assesses whether these efforts align with the objective of limiting the global **temperature rise to within 2 °C** compared to pre-industrial levels and to pursue additional efforts to limit the temperature increase to **1.5°C**. The findings provide valuable insights into the necessity for further efforts and the extent of additional measures required to effectively address climate change.

Q.46)

**Exp) Option c is correct**

Permafrost thaw is one of the gravest yet lesser discussed impacts of climate change. Permafrost covers **24 percent** of the surface of land masses in the northern hemisphere and accounts for nearly half of all organic carbon stored within the planet's soil. As long as this organic matter remains frozen, it will stay trapped in the permafrost. However, if it thaws, microbes will begin to eat the material, causing it to decay and **releasing carbon dioxide** and **methane** into the atmosphere. Even if a small fraction of these greenhouse gases are released, it will have major consequences on not only the Arctic, but Earth's entire climate system, as they intensify global climate change.

**Statement 1 is correct.** Permafrost thaw **destabilizes the ground** above it, damaging critical infrastructure, causing **unprecedented flooding**, and displacing entire communities. Soil that was once frozen year-round is now thawing and refreezing each year. When the ground thaws, the soil contracts and sinks, and when it freezes again it expands and rises. This continuous cycle shifts, displaces, and breaks whatever lies above it – roads, railroad tracks, pipes, buildings, and more.

**Statement 2 is correct.** The Arctic is warming more than two times faster than the global average. Permafrost thaw **contributes to a positive feedback** loop that further accelerates the warming of Earth, **releasing methane** which is a more powerful greenhouse gas than carbon, directly into the atmosphere, and contributing to the spread of devastating Arctic wildfires.

**Statement 3 is correct.** Thawing permafrost may lead to the **re-emergence of harmful bacteria** and diseases that have been frozen in the earth for hundreds of years and could harm Arctic ecosystems. An instance of this has already been seen in 2016, when an **anthrax outbreak** from a rotting animal carcass found in the permafrost caused over 70 people to be hospitalized in northern Russia and killed a child and more than 2,300 reindeer.

Q.50)

**Exp) Option b is the correct answer.**

The Climate Change Performance Index (CCPI) has been released each year, monitoring and assessing countries' progress in addressing climate change. It aims to increase transparency in global climate politics. The CCPI facilitates the comparison of climate protection efforts and progress made by individual countries, contributing to a clearer understanding of their commitments and actions in the fight against climate change.

**Statement 1 is incorrect:** The **Climate Change Performance Index (CCPI)** is an annual index published by the environmental research organization **NewClimate Institute, Germanwatch, and the Climate Action Network**, not by the United Nations Environment Programme (UNEP).

**Statement 2 is correct:** The Climate Change Performance Index (CCPI) assesses and scores countries according to their progress in climate mitigation. The CCPI evaluates nations across four categories, incorporating 14 indicators: **Greenhouse Gas Emissions (40% of the total score)**, **Renewable Energy (20%)**, **Energy Use (20%)**, and **Climate Policy (20%)**.