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CONTENTS

1 Ecology

1. The movement of nutrient elements through the various components of an ecosystem is called **UPPCS (Pre) 2020**

(a) Bio-geo-chemical cycle (b) Bio-geological cycle
(c) Ecological succession (d) Biological cycle

Answer: (a)

Explanation:

- The circulation of elements or nutrients from non-living to living and then back to the non-living components of the ecosystem in a circular fashion is known as biogeochemical cycle.The movement of nutrient elements through the various components of an ecosystem is also known as nutrient cycling.
- Geologic processes, such as weathering, erosion, water drainage, and the subduction of the continental plates, all play a role in the cycling of elements on Earth.
- Biogeochemical cycles are of two types:
  - **Gaseous Nutrient Cycle:** Carbon cycle, Nitrogen cycle, Hydrological cycle, etc.
  - **Sedimentary Nutrient Cycle:** Sulphur cycle, Phosphorous cycle.
- The reservoir for the gaseous type of nutrient cycle (e.g., nitrogen, carbon cycle) exists in the atmosphere and for the sedimentary cycle (e.g., sulphur and phosphorus cycle), the reservoir is located in Earth's crust.

Therefore, option (a) is the correct answer.

2. The entire sequence of communities that successively change in a particular area are called: **UPPCS (Pre) 2020**

(a) Ecological succession (b) Sere
(c) Community dynamics (d) Pyramid of biomass

Answer: (b)

Explanation:

- In ecology, succession is a directional non-seasonal cumulative change in the types of plant species that occupy a given area through time. It involves the processes of colonization, establishment, and extinction, which act on the participating plant species.
- Most successions contain a number of stages that can be recognized by the collection of species that dominate at that point in the succession.
- The entire sequence of communities that successively change in a given area are called sere(s).The individual transitional communities are termed seral stages or seral communities.
- In the successive seral stages, there is a change in the diversity of species of organisms, increase in the number of species and organisms as well as an increase in the total biomass.
- The sequence of seres for a given region is often fully predictable, both with respect to the general types of population expected at each sere and to seral durations. On land, for example, a climax stage (final stage) is often represented by a forest community. If the original physical environment is sand then the sequence of seres includes: soil-forming organisms (bacteria, lichens, mosses, fungi), annual grasses, perennial grasses, shrubs, and trees.

Therefore, option (b) is the correct answer.

3. Which of the following statement(s) is/are correct in respect of the 'ecoradicals'? **CAPF (ACs) Exam 2019**

1. They believe that human societies on earth are moving dangerously closer to the limits of the earth's carrying capacity.
2. They call for strict population control.
3. They stress on a less consumption-oriented and waste-producing way of life.

Select the correct answer using the code given below:

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

Answer: (d)

Explanation:

- Ecoradicals are those who think that the ecosystem has a limited carrying capacity which means how large a species population can become before it overuses the resources available in the ecosystem.
- Ecoradicals believe that human societies on earth are moving dangerously closer to the limits of the planet's carrying capacity; they also think that there are no simple technological fixes that can take care of the problem. So, many 'ecoradicals' call for strict population control and dramatic changes in modern lifestyles. **Hence statements 1 and 2 are correct.**

- It also involved dramatic changes in economic and political organization. They criticize such advice which calls for environment protection within a framework of sustainable growth (the Brundtland Report). Ecoradicals find that this is not at all sufficient. For some, real sustainability means abandoning industrial mass production and reverting to some form of deindustrialized society. Behind such radical ideas lies a world view profoundly different from the 'modernist-anthropocentric' view that is leading in western secular thinking, i.e., 'man is above nature'. The ecoradicals saw the world in a very different way; it puts equal value on humans and nature as part of one single biosystem and man has no right to exploit nature. Humans have a duty to live in harmony with nature. **Hence statement 3 is correct.**

Therefore, option (d) is the correct answer.

4. Which one of the following is the correct sequential phase in the successional development of vegetation community in a habitat? **CDS Exam (II) 2019**

(a) Migration, Reaction, Stabilization and Nudation
(b) Migration, Stabilization, Reaction and Nudation
(c) Nudation, Migration, Reaction and Stabilization
(d) Reaction, Migration, Stabilization and Nudation

Answer: (c)

Explanation:

- Ecological Succession is an orderly process of community change in a unit area. It is the process of change in species composition in an ecosystem over a period of time.
- The process begins with the establishment of a few pioneer species which are replaced or reduced in abundance by species of increased complexity.
- The process of ecological succession is completed through a series of sequential steps which are:
  - **Nudation**: Development of bare areas uninhabited by any organism, caused by factors such as emersion, submergence, glacial recession, erosion or deposits.
  - **Migration/ Invasion**: The process of migration/ invasion helps the arrival of seed, spores, or other reproductive propagules for the establishment of species.
  - **Ecesis**: This is the initial establishment of the plant community. The stage is called colonization.
  - **Competition**: Once the few initial species established in the region, the intra as well as interspecific competition for the resources such as food, water etc., starts.
  - **Reaction** : The environmental condition gets modified by the action of species occupying the habitat. These changes subsequently trigger the displacement and replacement of one species by another.
  - **Stabilization**: It is the process by which the climax community which is mature, self sustaining, stable and is the final stage of succession gets established.

Therefore, option (c) is the correct answer.

5. Food chain is: **CDS Exam (II) 2019**

(a) Relationship between autotrophic organisms
(b) Exchange of genetic materials between two organisms
(c) Passage of food (and thus energy) from one organism to another
(d) Modern entrepreneur establishment providing food outlets

Answer: (c)

Explanation:

- Food chains and energy flow are the functional properties of ecosystems which make them dynamic. The biotic and abiotic components of an ecosystem are linked through them.
- Transfer of food energy from green plants (producers) through a series of organisms with repeated eating and being eaten is called a food chain. For example, Grasses → Grasshopper → Frog → Snake → Hawk/Eagle.
- Each step in the food chain is called trophic level.

Therefore, option (c) is the correct answer.

6. Which one of the following is a terrestrial type of ecosystem? **Engineering Services (Pre) Exam 2019**

(a) Limnetic (b) Estuary
(c) Prairie (d) Reefs

Answer: (c)

Explanation:

- Ecosystem is broadly classified into terrestrial and aquatic ecosystems.
  - The terrestrial ecosystem is the one which involves the land based community of organisms and their interactions with biotic and abiotic components. For example, forest, grassland, desert, tundra etc.
  - The aquatic ecosystem includes pond, river, lake, wetland, estuary, ocean etc.
- Limnetic zone is the layer of open water where photosynthesis can occur.
- An estuary is a partially enclosed body of water, and its surrounding coastal habitats, where salt water from the ocean typically mixes with fresh water from rivers or streams.

- Prairies are enormous stretches of flat grassland with moderate temperatures, moderate rainfall, and few trees. These temperate grasslands are found in North America.
- Reefs are large underwater structures that are colonised by marine invertebrates called coral. Coral reefs are the most diverse of all marine ecosystems.

Therefore, option (c) is the correct answer.

7. Which of the following is associated with biological nitrogen fixation? **UPPCS (Pre) 2019**

(a) Red algae (b) Brown algae
(c) green algae (d) Blue-green algae

Answer: (d)

Explanation:

- Nitrogen Fixation process involves conversion of gaseous nitrogen into ammonia, a form in which it can be used by plants. Atmospheric nitrogen can be fixed by the following three methods:
  - **Atmospheric Fixation:** Lightening, combustion and volcanic activity help in the fixation of nitrogen.
  - **Industrial Fixation:** At high temperature and high pressure, molecular nitrogen is broken into atomic nitrogen which then combines with hydrogen to form ammonia.
  - **Bacterial Fixation:** It is performed by symbiotic bacteria such as Rhizobium in the root nodules of leguminous plants and Free living or symbiotic bacteria such as Nostoc, Azotobacter and Cyanobacteria (Blue-Green Algae) that can combine atmospheric or dissolved nitrogen with hydrogen to form ammonia.
- Blue-Green Algae are very important for the health and growth of many plants. They are one of the few groups of organisms that can convert inert atmospheric nitrogen into an organic form, such as nitrate or ammonia. It is these "fixed" forms of nitrogen which plants need for their growth, and must obtain from the soil.
- Cyanobacteria also form symbiotic relationships with many fungi, forming complex symbiotic "organisms" known as lichens.

Therefore, option (d) is the correct answer.

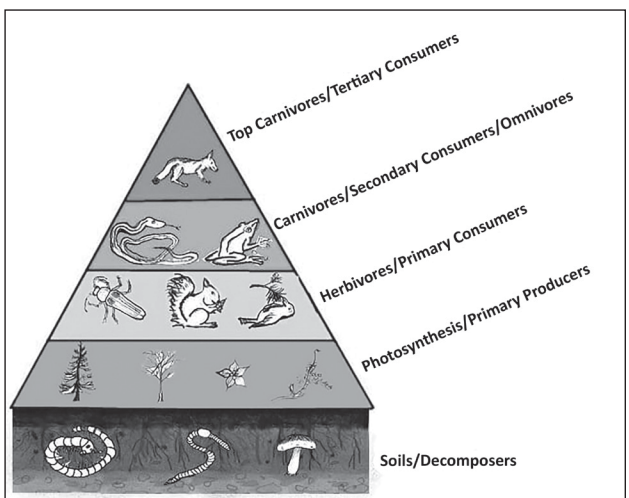
8. What is true about ecosystem? **UPPCS (Pre) 2019**

(a) Primary consumers are least dependent upon producers
(b) Primary Consumers are out-number producers
(c) Producers are more than Primary Consumers
(d) Secondary Consumers are the largest and most powerful

Answer: (c)

Explanation:

- Food webs and food chains illustrate the relationships between different organisms in an ecosystem by indicating "who eats whom." In a schematic that usually appears as a pyramid, organisms are divided based on their trophic level, or which consumer level they occupy. These pyramids illustrate the movement of energy from the broad base of producers at the bottom through the decreasing number of consumers up to the top of the pyramid.
- Primary Producers are those which produce their own food, also called autotrophs. They capture the energy present in sunlight and convert it into chemical energy.
- The organisms that eat the producers are the primary consumers. They tend to be small in size and there are many of them. The primary consumers are herbivores.
- The organisms that eat the primary consumers are carnivores and are called the secondary consumers. The secondary consumers tend to be larger in size and fewer in number. This continues on, all the way up to the top of the food chain.as consumers are fewer than producers.
- At each successive trophic level, 90% of the energy is lost and only 10% of the energy is transferred to the next level. Therefore, the energy transfer from one trophic level to the next, up the food chain, is like a pyramid; wider at the base and narrower at the top. Because of this inefficiency, there is only enough food for a few top level consumers, but there is lots of food for herbivores lower down on the food chain.



Trophic Levels

Therefore, option (c) is the correct answer.

9. Which one of the following is the well known example of a bio-indicator of air pollution? **UPPCS (Pre) 2019**

(a) Lichens (b) Methyl mercury
(c) Rose plant (d) Sunflower

Answer: (a)

Explanation:

- Bioindicators are living organisms such as plants, plankton, animals, and microbes, which are used to assess the health of the natural ecosystem in the environment. Some of the examples include:
  - Lichens are powerful bioindicators of air quality.
  - Frogs are basically influenced by changes that take place in their freshwater and terrestrial habitats.
  - Algal blooms are often used to indicate large increase of nitrates and phosphates in lakes and rivers.
- **Lichens as Bioindicators**
  - Lichens is a symbiotic relationship between algae and fungi. The fungus provides shelter for the algae and the algae provides food for the fungi. Lichens do not have roots; instead they receive all their nutrients from the atmosphere.
  - They are sensitive to atmospheric pollution such as nitrogen (N) because they receive all their nutrients and water from wet and dry atmospheric deposition (fall out). Nitrogen deposition can increase the load of nutrients. Too much nitrogen can harm and kill the algae's chlorophyll, which is used to produce sugars feeding it and the fungi.
  - Certain species of lichen are more tolerant of nitrogen than others. Scientists monitor lichen communities. If an increase in nitrogen tolerant species in combination with a decrease in nitrogen sensitive species occurs this may indicate an increase in atmospheric nitrogen deposition.
  - Lichens are the "canaries in the coal mine" of nitrogen deposition. A shift in their species composition and/or their health exemplifies the potential beginning of ecosystem decline due to nitrogen deposition.

Therefore, option (a) is the correct answer.

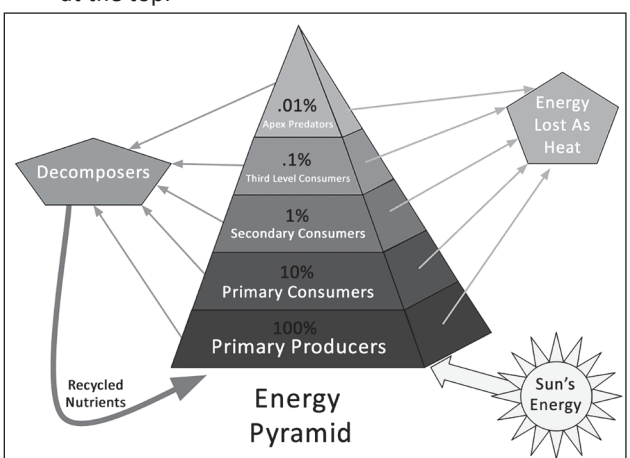
10. The amount of energy during transfer from one trophic level to another in an ecosystem **UPPCS (Pre) 2019**

(a) Increases
(b) Decreases
(c) Remains constant
(d) May increase or decrease

Answer: (b)

Explanation:

- In an ecosystem organisms are related to each other through the feeding mechanism or trophic levels, i.e., an organism consumes another for food and energy.
- Trophic levels represent the position an organism occupies in a food chain. Food chains start at trophic level 1 with primary producers such as plants, move to herbivores at level 2, and predators at level 3 and typically finish with carnivores or apex predators at level 4 or 5. Ecological communities with higher biodiversity form more complex trophic paths. The various trophic levels are:
  - **Level 1:** Plants and algae make their own food and are called primary producers.
  - **Level 2:** Herbivores eat plants and are called primary consumers.
  - **Level 3:** Carnivores that eat herbivores are called secondary consumers.
  - **Level 4:** Carnivores that eat other carnivores are called tertiary consumers.
  - **Level 5:** Apex predators that have no predators are at the top of the food chain.
- The amount of energy at each trophic level decreases as it moves through an ecosystem. As little as 10 percent of the energy at any trophic level is transferred to the next level; the rest is lost largely through metabolic processes as heat. Therefore, the energy transfer from one trophic level to the next, up the food chain, is like a pyramid; wider at the base and narrower at the top.



Flow of Energy

Therefore, option (b) is the correct answer.

11. The most biodiversity rich area in India is **UPPCS (Pre) 2019**

(a) Gangetic plain (b) Trans Himalayas
(c) Western Ghats (d) Central India

Answer: (c)

Explanation:

- The Western Ghats are internationally recognized as a region of immense global importance for the conservation of biological diversity, besides containing areas of high geological, cultural and aesthetic values.
- A chain of mountains running parallel to India's western coast, approximately 30-50 km inland, the Ghats traverse the States of Kerala, Tamil Nadu, Karnataka, Goa, Maharashtra and Gujarat. It is interrupted by Palghat Pass.
- Older than the Great Himalayan mountain chain, the Western Ghats are home to four tropical and subtropical moist broadleaf forest ecoregions – the North Western Ghats moist deciduous forests, North Western Ghats montane rain forests, South Western Ghats moist deciduous forests, and South Western Ghats montane rain forests.
- These mountains act as a rain barrier during southwest monsoon, leading to ample rainfall and source to 58 major rivers.
- A significant characteristic of the Western Ghats is the exceptionally high level of biological diversity and endemism. This mountain chain is recognized as one of the world's eight 'hottest hotspots' of biological diversity along with Sri Lanka. It is also a UNESCO World Heritage Site.
- The forests of the Western Ghats include some of the best representatives of non equatorial tropical evergreen forests in the world. At least 325 globally threatened (IUCN Red Data List) species occur in the Western Ghats.

Therefore, option (c) is the correct answer.

12. With reference to the Deep Carbon Observatory (DCO) which of the following statements is/are correct? **UPPCS (Pre) 2019**

1. It is global research programme to outreach role of carbon on earth.
2. It conducts field observations of deep microbial ecosystems.

Select the correct answer using the code given below:

Codes:

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

Answer: (c)

Explanation:

- The Deep Carbon Observatory (DCO) is a global research program designed to transform understanding of carbon's role in Earth. To complement this research, the DCO's infrastructure includes public engagement and education, online and offline community support, innovative data management, and novel instrumentation development. **Hence, statement 1 is correct**.
- The Deep Carbon Observatory's research considers the global carbon cycle beyond Earth's surface. It explores high-pressure and extreme temperature organic synthesis, complex interactions between organic molecules and minerals, conducts field observations of deep microbial ecosystems and of anomalies in petroleum geochemistry, and constructs theoretical models of lower crust and upper mantle carbon sources and sinks. **Hence, statement 2 is correct**.
- Considerable amounts of life forms, including 70% of bacteria and archaea on Earth, comprising up to 23 billion tonnes of carbon, live up to at least 4.8 km (3.0 mi) deep underground, including 2.5 km (1.6 mi) below the seabed, according to a ten-year Deep Carbon Observatory project.

Therefore, option (c) is the correct answer.

13. Match List I with List II and select the correct using the codes given below the lists: **UPPCS (Pre) 2019**

List-I	**List-II**
A. Epiphytes	1. Mediterranean
B. Acacia	2. Equatorial
C. Baobab	3. Sahara
D. Cedars	4. Savanna

Codes:

	A	**B**	**C**	**D**
(a)	2	3	4	1
(b)	2	3	1	4
(c)	2	4	3	1
(d)	2	4	1	3

Answer: (c)

Explanation:

Vegetation	Features
Epiphytes (A-2)	❑ **Climate:** Equatorial ❑ An epiphyte grows on the surface of a plant and derives its moisture and nutrients from the air, rain, water or from debris accumulating around it.

Contd...

2 Biodiversity & Its Conservation

1. With reference to India's biodiversity, Ceylon frogmouth, Coppersmith barbet, Gray-chinned minivet and White-throated redstart are **UPSC CSE (Pre) 2020**

(a) Birds (b) Primates
(c) Reptiles (d) Amphibians

Answer: (a)

Explanation:

- The above mentioned species constitute the part of the Avian Ecology.
- Ceylonfrogmouth is a grey-brown nocturnal bird species that is found in the Western Ghats and Sri Lanka's forested habitats.
  - It is distinguished by its wide, hooked bill with slit-like nostrils and a large head with eyes facing forward.
  - With destruction of forest cover, this species is likely compelled to now take refuge in cashew plantations.
- Coppersmith barbet, also called crimson-breasted barbet and coppersmith, is an Asian barbet with crimson forehead and throat. It is known for its metronomic call that sounds similar to a coppersmith striking metal with a hammer.
  - It is a resident bird in the Indian subcontinent and parts of Southeast Asia.
- White-throated redstart is a species of bird in the Muscicapidae family.
  - It is found in Bhutan, China, India, Myanmar, and Nepal.
- Grey-Chinned Minivet is a species of bird in the Campephagidae family.
  - It is found in Bangladesh, Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Taiwan, Thailand and Vietnam.
  - Its natural habitat is subtropical or tropical moist lowland forests.

Therefore, option (a) is the correct answer.

2. Which one of the following is ***not*** a major cause of Wildlife Extinction? **UPPCS (Pre) 2020**

(a) Loss of natural habitat
(b) To make fire in the forest
(c) Illegal commercial trade of wildlife
(d) Fast pace of population growth

Answer: (d)

Explanation:

- Extinction means complete disappearance of a species, that is, not a single member of the extinct species is found on the earth. It is an irreversible loss and is called biological extinction. Before a species goes biologically extinct, it goes through stages of local and ecological extinction.
- Extinction occurs when species are diminished because of environmental forces like habitat fragmentation, global change, natural disaster, overexploitation of species for human use or because of evolutionary changes in their members such as genetic inbreeding, poor reproduction, decline in population numbers.
- **Other Reasons for Extinction**
  - Endemism,
  - Restricted food source,
  - Pollution,
  - Migration,
  - Predation, competition, and disease.

Therefore, option (d) is the correct answer.

3. With reference to the detailed report of Tiger Census 2018 released by Government of India in July 2020, which of the following Statements(s) is/are correct **UPPCS (Pre) 2020**

1. India has 70% of total global tiger's population
2. Nearby 30% of India's tigers live outside tiger reserve.

Select the correct answer from the codes given below

Codes:

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

Answer: (c)

Explanation:

- The fourth cycle of the Tiger Census 2018, conducted in 2018-19 is the most comprehensive in terms of both resource and data recorded.
- Tigers are at the top of the food chain and are sometimes referred to as "umbrella species" that is their conservation also conserves many other species in the same area.

- The Tiger estimation exercise that includes habitat assessment and prey estimation reflects the success or failure of Tiger conservation efforts in India .
- The census is done quadrennially (every four years) by the National Tiger Conservation Authority (NTCA) with technical help from the Wildlife Institute of India. It is done with cooperation from the state Forest Departments and partners.
- According to results of the Tiger census, the total count of tigers has risen to 2,967 from 2,226 in 2014 — an increase of 741 individuals (aged more than one year), or 33%, in four years.
- India has 70% of the global tiger population. **Hence, statement 1 is correct.**
- Nearby 30% of India's tigers live outside tiger reserve. **Hence, statement 2 is correct.**
- India has achieved the target of doubling the tiger count four years ahead of the deadline of 2022.
- **Top Performers:** Madhya Pradesh saw the highest number of tigers (526) followed by Karnataka (524) and Uttarakhand (442).
- **Increase in Tiger population:** Madhya Pradesh (71%) > Maharashtra (64%) > Karnataka (29%).
- **Worst Performers:** Chhattisgarh and Mizoram saw a decline in tiger population.

Therefore, option (c) is the correct answer.

4. Which of the following statements with regard to Biosphere Reserve is/are correct?

NDA & NA Exam (I-II) 2020

1. The idea of Biosphere Reserve was initiated by UNESCO in 1973-74
2. There are 18 designated Biosphere Reserves in India
3. All Biosphere Reserves in India have been included in world network of Biosphere Reserves of UNESCO

Select the correct answer using the code given below:

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

Answer: (b)

Explanation:

- The idea of Biosphere Reserve was initiated by UNESCO in 1975 as a part of UNESCO's 'Man and Biosphere Programme', dealing with the conservation of ecosystems and the genetic resources contained therein. **Hence, statement 1 is not correct.**
- There are eighteen designated and notified Biosphere Reserves in India such as Nilgiri, Nanda Devi, Nokrek, Great Nicobar, Gulf of Mannar, Manas, Sunderbans, etc. **Hence, statement 2 is correct.**
- 12 of the 18 biosphere reserves in India have been included in world network of Biosphere Reserves of UNESCO.

Therefore, option (b) is the correct answer.

5. Which one of the following is ***not*** a reason of decrease in biodiversity? **NDA & NA Exam (I-II) 2020**

(a) Large scale deforestation
(b) Exploitation of forest produces
(c) Maintaining sacred groves
(d) Encroachment in forest areas

Answer: (c)

Explanation:

- In order to maintain biodiversity, some patches of forest are left untouched. These types of forests are regarded as "sacred groves". It is one among the various methods of biodiversity conservation.
- Sacred groves contribute in biodiversity protection whereas large scale deforestation, exploitation of forest produces and encroachment in forest areas contribute in decrease in biodiversity.

Therefore, option (c) is the correct answer.

6. Which one of the following National Parks lies completely in the temperate alpine zone? **UPSC CSE (Pre) 2019**

(a) Manas National Park
(b) Namdapha National Park
(c) Neora Valley National Park
(d) Valley of Flowers National Park

Answer: (d)

Explanation:

- Manas National Park is located at the base of the foothills of the Bhutan-Himalayas in the State of Assam. It is one of the first reserves included in the network of tiger reserves under Project Tiger in 1973.
  - In 1985, it was inscribed as a World Heritage Site and in 1989 it acquired the status of a Biosphere Reserve.
  - It is the only landscape in the world where pristine Terai grasslands are seen merging with the Bhabar grasslands interspersed with diverse habitats ascending to semi-evergreen forests and then to Bhutan Himalayas.
  - Pygmy Hog is known to be found only here.
- Namdapha National Park and Tiger Reserve lies along the international border between India and Myanmar in Changlang district in the State of Arunachal Pradesh.
  - It is the only park in the world to have the four Feline species of big cat namely the Tiger (Panthera tigris),

Leopard (Panthera pardus), Snow Leopard (Panthera uncia) and Clouded Leopard (Neofelis nebulosa) and a number of small cats.

- Neora Valley National Park is located in the Darjeeling district of the State of West Bengal. It was established in the year 1986.
  - The name 'Neora Valley' is given after the river 'Neora' flowing through it. The park is one of the richest biological zones in the entire northeastern India.
  - It is known for the endangered red panda, Himalayan tahr, Himalayan black bear among its faunal diversity.
  - The northern boundary of the Neora Valley National Park is contiguous with the forest of Sikkim and Bhutan.
- Valley of Flowers National Park is located in the Chamoli district of Uttarakhand and is known for its meadows of endemic alpine flowers and the variety of flora. It lies completely in the temperate alpine zone.
  - The valley is divided into three sub-alpine zones – between 3,200 m and 3,500 m which is the limit of trees; lower alpine between 3,500 m and 3,700 m, and higher alpine above 3,700 m.
  - The park is also home to rare and endangered animals, including the Asiatic black bear, snow leopard, musk deer, brown bear, red fox, and blue sheep. Birds found in the park include Himalayan monal, pheasant and other high-altitude birds.

Therefore, option (d) is the correct answer.

7. Consider the following statements:

UPSC CSE (Pre) 2019

1. Asiatic lion is naturally found in India only.
2. Double-humped camel is naturally found in India only.
3. One-horned rhinoceros is naturally found in India only.

Which of the statement(s) given above is/are correct?

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

Answer: (a)

Explanation:

- Asiatic lions were once found in regions ranging from Persia (Iran) to Eastern India.
  - By late 1890s range of Asiatic lions got restricted to the Gir forest range of Gujarat, India. **Hence, statement 1 is correct.**
  - With the continuous efforts of State and Union Government, the population of Asiatic lions increased from 50 in the late 1890s to over 500 at present.
  - IUCN status of Asiatic Lion is Endangered.
- The double-humped camel is a native of the Gobi Desert and is found on a vast expanse of cold-desert areas across Mongolia, China, Kazakhstan, Turkmenistan, Uzbekistan and parts of Afghanistan. **Hence, statement 2 is not correct.**
  - IUCN status of the double-humped camel is Critically Endangered.
- The One-horned rhinoceros is found in North-Eastern India and the Terai grasslands of Nepal. **Hence, statement 3 is not correct.**
  - IUCN status of the One-horned rhinoceros is Vulnerable.

Therefore, option (a) is the correct answer.

8. Consider the following statements:

UPSC CSE (Pre) 2019

1. Some species of turtles are herbivores.
2. Some species of fish are herbivores.
3. Some species of marine mammals are herbivores.
4. Some species of snakes are viviparous.

Which of the statements given above are correct?

(a) 1 and 3 only (b) 2, 3 and 4 only
(c) 2 and 4 only (d) 1, 2, 3 and 4

Answer: (d)

Explanation:

- Green sea turtles are adapted to mostly vegetarian diet of sea grasses and algae. As adults, these are the only predominantly herbivorous sea turtles, although they are carnivorous from hatching until juvenile size. **Hence, statement 1 is correct.**
- Surgeonfish and parrotfish are two species of fish often seen feeding on reef algae. **Hence, statement 2 is correct.**
- Manatees, sometimes called sea cows, are large mammals that live in the warm sea waters. They live in shallow coastal areas and feed on sea vegetation. **Hence, statement 3 is correct.**
- Snakes that are viviparous nourish their young ones through a placenta and yolk sac. Boa constrictors and green anacondas are two examples of viviparous snakes. **Hence, statement 4 is correct.**

Therefore, option (d) is the correct answer.

9. Consider the following pairs **UPSC CSE (Pre) 2019**

	Wildlife		**Naturally found in**
1.	Blue-finned Mahseer	:	Cauvery River
2.	Irrawaddy Dolphin	:	Chambal River
3.	Rusty-spotted Cat	:	Eastern Ghats

Which of the pairs given above are correctly matched?

(a) 1 and 2 only (b) 2 and 3 only

(c) 1 and 3 only (d) 1, 2 and 3

Answer: (c)

Explanation:

- The Western Ghats region is famous for freshwater biodiversity. Mahseer, belonging to the genus Tor, is of great cultural value. The Mahseer community comprises two varieties—a "blue-finned" fish and an "orange-finned, hump backed" fish and are naturally found in Cauvery river. It is listed as critically endangered in IUCN Red List. **Hence, pair 1 is correctly matched.**
- Irrawaddy Dolphins are found in coastal areas in South and Southeast Asia, and in the three rivers– Ayeyarwady (Myanmar), Mahakam (Indonesia) and the Mekong. In India, Irrawaddy Dolphin is found in Chilika lake. It is listed as critically endangered in IUCN Red List. **Hence, pair 2 is not correctly matched**.
- Forests of the Eastern Ghats are home to some endangered and lesser-known mammal species like the Fishing Cat, Rusty Spotted Cat, Indian Pangolin, etc. Rusty Spotted Cat is listed as near threatened in IUCN Red List. **Hence, pair 3 is correctly matched.**

Therefore, option (c) is the correct answer.

10. Which of the following organisms belongs to Coelenterata (Cnidaria)? **CAPF (ACs) Exam 2019**

(a) Planaria and liver fluke

(b) Sea urchin And Sea cucumber

(c) Hydra and sea anemone

(d) Euplectella and sycon

Answer: (c)

Explanation:

- Phylum Cnidaria (Coelenterata) is a group made up of more than 9,000 living species. These are mostly marine animals including the corals, hydras, jellyfish, Portuguese man-of-war, sea anemones, sea pens, sea whips, and sea fans.
- There are two major body forms among the Cnidaria - the polyp (Hydra and Sea anemone) and the medusa (jellyfish).
- The phylum Cnidaria is made up of four classes:
  - Hydrozoa (hydrozoans)
  - Scyphozoa (scyphozoans)
  - Anthozoa (anthozoans)
  - Cubozoa (cubozoans)

Therefore, option (c) is the correct answer.

11. Phreatophytes are the plants adapted to grow in **CAPF (ACs) Exam 2019**

(a) Moist shaded places

(b) Rocky environments

(c) Arid environments

(d) Active volcanic lava

Answer: (c)

Explanation:

- Phreatophytes are the desert plants or the plants of arid environments, with long deep roots that are capable of reaching the water table.
- Some of the traits of Phreatophytes include:
  - rapid vertical root growth;
  - vigorous vegetative regeneration;
  - high hydraulic conductance;
  - high rates of biomass production; and
  - low water use efficiency.
- Phreatophytes' deep root system helps them to reach saturation zones to access water during extended periods of drought. This is the reason why they are considered to be hydro-ecological plant type.

Therefore, option (c) is the correct answer.

12. Which one of the following states of India has the largest forest cover? **CAPF (ACs) Exam 2019**

(a) Himachal Pradesh (b) Arunachal Pradesh

(c) Karnataka (d) Uttarakhand

Answer: (b)

Explanation:

- The Ministry of Environment, Forests and Climate Change releases the India State of Forest Report (ISFR). It is a biennial publication of the Forest Survey of India (FSI), an organization under the Ministry of Environment, Forest, and Climate Change.
- Forest cover includes all lands having trees more than one hectare in an area with tree canopy density of more than 10%, irrespective of ownership, legal status of the land and species composition of trees.
- Largest forest cover in India in decreasing order: Madhya Pradesh > Arunachal Pradesh > Chhattisgarh > Odisha > Maharashtra.
- Forest cover as percentage of total geographical area in decreasing order as per ISFR 2019: Mizoram (85.41%) > Arunachal Pradesh (79.63%) > Meghalaya (76.33%) > Manipur (75.46%) > Nagaland (75.31%).

Therefore, option (b) is the correct answer.

13. Which one of the following organisms is dependent on saprophytic mode of nutrition? **CDS Exam (I) 2019**

(a) Agaricus (b) Ulothrix
(c) Riccia (d) Cladophora

Answer: (a)

Explanation:

- In saprophytic nutrition the organisms obtain their food from dead and decaying organic matter of dead plants, dead animals and other decomposing organic matter. The organisms which are dependent on saprophytic mode of nutrition are known as saprophytes.
- Fungi, bread molds, some protists and many bacteria are saprophytic in nutrition. The saprophytic organisms like fungi releases digestive enzymes in their surrounding medium to convert the complex organic molecules such as sugars in simple forms such as glucose.
- This simple food is then absorbed through the body surface, and utilized for various activities by fungus.
  - Agaricus is a saprophytic mushroom that grows on humus soil, decaying litter, wood logs and manure piles. It grows best in moist and shady places and is commonly seen during rainy season.
  - The genus Agaricus comprises the most edible and widely consumed species. *A. bisporus* (*A. brunnescence*; white mushroom), *A. campestris* (field mushroom) are common edible mushrooms. Some species of Agaricus are poisonous and some may cause gastrointestinal disturbances in some persons (e.g., *A. placomyces*, *A. silvaticus*).
- Ulothrix is a genus of filamentous green algae (family Ulotrichaceae) found in marine and fresh waters.
- Riccia is a genus of liverworts in the order Marchantiales. These plants are small and thalloid, that is not differentiated into root, stem and leaf.
- Cladophora is a genus of reticulated filamentous Ulvophyceae (Green Algae).

Therefore, option (a) is the correct answer.

14. Which one of the following pair of animals is warm blooded? **CDS Exam (I) 2019**

(a) Crocodile and Ostrich
(b) Hagfish and Dogfish
(c) Tortoise and Ostrich
(d) Peacock and Camel

Answer: (d)

Explanation:

- Warm-blooded animals are those animal species that have the ability to regulate and maintain relatively constant internal body temperature. Generally, homeothermic species maintain a stable body temperature by regulating metabolic processes.
- The ability to maintain an internal temperature distinguishes these (warm-blooded animals) from cold-blooded, or poikilothermic animals, which usually have about the same temperature as their environment. Warm-blooded animals are able to remain active in situations in which cold-blooded ones cannot.
- As crocodiles and tortoise belong to the reptile family they are not warm-blooded. Fishes are also cold blooded and cannot regulate their temperature. Therefore, the only plausible pair is peacock and camel.

Therefore, option (d) is the correct answer.

15. E.K. Janaki Ammal National Award on Taxonomy is administered by the **CDS Exam (I) 2019**

(a) Ministry of Agriculture and Farmers Welfare
(b) Ministry of New and Renewable Energy
(c) Ministry of Health and Family Welfare
(d) Ministry of Environment, Forest and Climate Change

Answer: (d)

Explanation:

- Taxonomy is the science of identification, classification and naming of living organisms. Taxonomic work involves study of morphological characteristics and phylogenetic relationship of organisms which is essential for applied biological sciences, such as medicine, agriculture, forestry and fisheries.
- In 1999, the Ministry of Environment, Forest and Climate Change initiated E.K. Janaki Ammal National Award in the honor of late Prof. E.K. Janaki Ammal to encourage young students and scholars to work in this field of science.
- Late Prof. Janaki Ammal did taxonomic work of outstanding merit and excellence, particularly in the area of cytotaxonomy and has been a source of inspiration to many young scientists.

Therefore, option (d) is the correct answer.

16. Coral reefs are ***not*** found in which one of the following regions? **CDS Exam (II) 2019**

(a) Lakshadweep Islands (b) Gulf of Kachchh
(c) Gulf of Mannar (d) Gulf of Cambay

Answer: (d)

Explanation:

- Coral reefs are one of the most biologically diverse marine ecosystems on the earth. Corals grow over geological time scales and have been in existence for about 200 million years.

3 Protected Area Network

1. Which of the following Protected Areas are located in Cauvery basin? **UPSC CSE (Pre) 2020**

1. Nagarhole National Park
2. Papikonda National Park
3. Sathyamangalam Tiger Reserve
4. Wayanad Wildlife Sanctuary

Select the correct answer using the code given below:

(a) 1 and 2 only (b) 3 and 4 only

(c) 1, 3 and 4 only (d) 1, 2, 3 and 4

Answer: (c)

Explanation:

- **Nagarhole National Park**
  - This park is also known as Rajiv Gandhi National Park and is located in the two districts of Karnataka, namely Mysore and Kodagu.
  - The park was established as a wildlife sanctuary in 1955 and was upgraded into a national park in 1988. The park was declared as the 37th Tiger reserve in 1999.
  - Kabini, a tributary of the Cauvery River, is the largest river draining the park. **Hence, 1 is correct.**
- **Papikonda National Park**
  - This park is spread over 1012.86 square kilometres area in East and West Godavari districts of Andhra Pradesh.
  - The National Park was termed as a reserve forest in 1882, a wildlife sanctuary in 1978, and as a national park from 2008.
  - The park lies along the left and right banks of the river Godavari and cuts through the Papikonda hill range of Eastern Ghats. **Hence, 2 is not correct.**
- **Sathyamangalam Tiger Reserve**
  - Sathyamangalam Wildlife Sanctuary and Tiger Reserve is a protected area and Tiger Reserve along the Western Ghats in the Erode district of the state of Tamil Nadu.
  - In the northern part of Erode district, Palar river flows and drains into Cauvery river. **Hence, 3 is correct.**
- **Wayanad Wildlife Sanctuary**
  - Located in Kerala, Wayanad Wildlife Sanctuary (WWS) is an integral part of the Nilgiri Biosphere Reserve. It was established in 1973.
  - It is contiguous to the tiger reserves of Nagarhole and Bandipur of Karnataka and Mudumalai of Tamil Nadu.
  - Kabini river (a tributary of Cauvery river) flows through the sanctuary. **Hence, 4 is correct.**

Therefore, option (c) is the correct answer.

2. Which one of the following protected areas is well-known for the conservation of a sub-species of the Indian swamp deer (Barasingha) that thrives well on hard ground and is exclusively graminivorous? **UPSC CSE (Pre) 2020**

(a) Kanha National Park

(b) Manas National Park

(c) Mudumalai Wildlife Sanctuary

(d) Tal Chhapar Wildlife Sanctuary

Answer: (a)

Explanation:

- Hard ground swamp deer or Barasingha (*Rucervusduvaucelii*), the state animal of Madhya Pradesh, is seeing a revival in the Kanha National Park and Tiger Reserve (KNPTR).
- Swamp Deer was close to extinction in the Kanha National Park. However, with the conservation efforts, the population currently numbers around 800.
- The deer is endemic to the Kanha National Park and Tiger Reserve on the Maikal Range of Satpura Hills. Measures like captive breeding and habitat improvement were used for the conservation of the species.

Therefore, option (a) is the correct answer.

3. Among the following Tiger Reserves, which one has the largest area under "Critical Tiger Habitat" ? **UPSC CSE (Pre) 2020**

(a) Corbett (b) Ranthambore

(c) Nagarjunasagar-Srisailam (d) Sundarbans

Answer: (c)

Explanation:

- Critical Tiger Habitats (CTH), also known as core areas of tiger reserves, are identified under the Wild Life Protection Act, 1972 based on scientific evidence that "such areas are required to be kept as in-violative for the purpose of tiger conservation, without affecting the rights of the Scheduled Tribes or such other forest-dwellers".
- The CTHs are notified by the state government in consultation with the expert committee constituted for the purpose.
- Area of the core/critical tiger habitat:
  - Corbett (Uttarakhand): 821.99 sq.kms
  - Ranthambore (Rajasthan): 1113.36 sq.kms
  - Sundarbans (West Bengal): 1699.62 sq.kms
  - Nagarjunsagar Srisailam (part of Andhra Pradesh) : 2595.72 sq. kms

Therefore, option (c) is the correct answer.

4. The National Chambal Sanctuary does ***not*** fall in which of the following States? **UPPCS (Pre) 2020**

(a) Uttar Pradesh (b) Madhya Pradesh
(c) Haryana (d) Rajasthan

Answer: (c)

Explanation:

- National Chambal Sanctuary, also called the National Chambal Gharial Wildlife Sanctuary, is located along the Chambal River on the tri-junction of Rajasthan, Madhya Pradesh and Uttar Pradesh. It is known for critically endangered gharial (small crocodiles), the red-crowned roof turtle and the endangered Ganges river dolphin.
- It was first declared as a Protected Area in Madhya Pradesh in 1978 and now constitutes a long narrow eco-reserve co-administered by the three states. Within the sanctuary the Chambal River cuts through mazes of ravines and hills with many sandy beaches along its banks.

Therefore, option (c) is the correct answer.

5. Match List-I with List-II and select the correct answer using the codes given below of India **UPPCS (Pre) 2020**

List-I (National Park)	**List-II (State)**
A. Indravati	1. Jharkhand
B. Mollem	2. Haryana
C. Kalesar	3. Goa
D. Betla	4. Chhattisgarh

Codes:

	A	**B**	**C**	**D**
(a)	4	3	2	1
(b)	4	2	3	1
(c)	4	1	3	2
(d)	3	4	2	1

Answer: (a)

Explanation:

National Park	Features
Indravati (A-4)	❑ Indravati National Park is a national park located in Bijapur district of Chhattisgarh state of India. It derives its name from the nearby Indravati River. ❑ It attained the status of a national park in 1981 and a tiger reserve in 1983 under the famous Project Tiger of India to become one of the most famous tiger reserves of India. ❑ It is home to one of the last populations of rare wild buffalo. It is one among the two project tiger sites in Chhattisgarh along with Udanti-Sitanadi. ❑ The Indravati river flows from east to west and forms the northern boundary of the reserve with the Indian state of Maharashtra.
Mollem (B-3)	❑ The Mollem National Park is located near the town of Mollem, 60 km south east from Panaji, the capital city of Goa. It is spread over 240 sq km in the Western Ghats. ❑ Earlier known as Mollem game sanctuary, it was declared a wildlife sanctuary in 1969 and renamed Bhagwan Mahaveer Sanctuary. ❑ The core area of the sanctuary spread over 107 sq km was named Mollem National Park in 1978. Since then the national park is called Bhagwan Mahaveer Sanctuary and Mollem National Park. ❑ The reserve has several temples dating back to the Kadamba Dynasty. ❑ The Mormugao–Londa railway line also passes amidst thick jungles of the national park. ❑ Several species of snakes including the King Cobra, Hump-nosed pit viper, Indian rock python and Malabar pit viper are found in the park.

Contd...

National Park	Features
Betla (D-1)	❑ The Betla National Park is located in Jharkhand. It was first established as a sanctuary and later upgraded to its present status. ❑ Average elevation is about 1000 feet and though the park is open throughout the year the best time to visit is between November to March. ❑ Gour, Chital, Elephant, Tiger, Panther, Sloth, Wild Bear, Sambhar, Nilgai, Kakar, Mouse Deer are permanent residents. Langurs are present in large families. ❑ Betla features waterfalls and natural hot springs on one hand, and historical monuments including a 16th century fort of Chero kings on the other.
Kalesar (C-2)	❑ Kalesar National Park is situated in the foothills of Shiwalik ranges of mighty Himalayas. ❑ On map it is located between 300 18' to 300 27' North latitude and 770 18' to 770 35' East longitude. It falls under Yamunanagar District of Haryana, sharing boundary with three States viz., Himachal Pradesh, Uttrakhand and U.P. ❑ The Yamuna river forms the Eastern boundary with Uttar Pradesh, the main Shiwalik ridge separates State boundary among Haryana, Himachal Pradesh and Uttarakhand in the north.

Therefore, option (a) is the correct answer.

6. Which of the following are in Agasthyamala Biosphere Reserve? **UPSC CSE (Pre) 2019**

(a) Neyyar, Peppara and Shendurney Wildlife Sanctuaries; and Kalakad Mundanthurai Tiger Reserve

(b) Mudumalai, Sathyamangalam and Wayanad Wildlife Sanctuaries; and Silent Valley National Park

(c) Kaundinya, Gundla Brahmeswaram and Papikonda Wildlife Sanctuaries; and Mukurthi National Park

(d) Kawal and Sri Venkateswara Wildlife Sanctuaries; and Nagarjunasagar-Srisailam Tiger Reserve

Answer: (a)

Explanation:

- ❑ The Agasthyamalai Biosphere Reserve is located in the Western Ghats on the border of the districts of Kollam and Thiruvanthapuram. Consisting mostly of tropical forest, the site is home to 2,254 species of higher plants, including about 400 that are endemic.
- ❑ It is also a unique genetic reservoir of cultivated plants, in particular cardamom, jamun, nutmeg, pepper and plantain.
- ❑ Three Wildlife Sanctuaries – Shendurney, Peppara and Neyyar, and the Kalakad Mundanthurai Tiger Reserve are located in the site.

Therefore, option (a) is the correct answer.

7. Which one of the following Forest Acts divided forests of India into reserved, protected and Village Forests? **CAPF (ACs) Exam 2019**

(a) Forest Act 1864 (b) Forest Act 1865

(c) Forest Act 1866 (d) Forest Act 1878

Answer: (d)

Explanation:

- ❑ The Forest Act of 1878 classified forests in India into three categories i.e., reserved, protected and village forests.
- ❑ The Act attempted to regulate the collection of forest produce by forest dwellers and some activities declared as offences and imprisonment and fines were imposed in this policy to establish the state control over forests.
- ❑ **Types of Forests**
  - ❍ **Reserved Forests:** These are the most restricted forests and are constituted by the State Government on any forest land or wasteland which is the property of the Government.
  - ❍ **Protected Forests:** The State Government is empowered to constitute any land other than reserved forests as protected forests over which the Government has proprietary rights and the power to issue rules regarding the use of such forests.
  - ❍ **Village Forests:** These are the one in which the State Government may assign to 'any village community the rights of Government to or over any land which has been constituted a reserved forest'.

Therefore, option (d) is the correct answer.

8. In which one of the following States is Pakhui Wildlife Sanctuary located? **UPSC CSE (Pre) 2018**

(a) Arunachal Pradesh (b) Manipur

(c) Meghalaya (d) Nagaland

Answer: (a)

Explanation:

- Pakhui Wildlife Sanctuary lies in the foothills of the Eastern Himalaya in the East Kameng district of Arunachal Pradesh. It was declared as a sanctuary in 1977 and a tiger reserve (also known as Pakke Tiger Reserve) in 2002.
- At least 40 mammal species occur in the Pakhui Wildlife Sanctuary.
  - **Large Cats:** Tiger, Leopard and Clouded Leopard
  - **Canids:** Wild Dog and Asiatic Jackal
  - **Herbivore Species:** Elephant, Barking Deer, Gaur and Sambhar
  - **Commonest Monkeys:** Rhesus and Assamese Macaques, and Capped Langur
  - The site is also home to as many as sixteen species of civets, weasels and mongooses.

Therefore, option (a) is the correct answer.

9. Which of the following National Parks of India are declared as World Heritage by UNESCO?

CDS Exam (I) 2018

1. Keoladeo National Park
2. Sundarbans National Park
3. Kaziranga National Park
4. Ranthambore National Park

Select the correct answer using the code given below.

(a) 1 and 2 only (b) 1, 2 and 3 only
(c) 3 and 4 only (d) 1, 2, 3 and 4

Answer: (b)

Explanation:

- A World Heritage Site is a place that is listed by UNESCO for its special cultural or physical significance. The list of World Heritage Sites is maintained by the international 'World Heritage Programme', administered by the UNESCO World Heritage Committee.
- This is embodied in an international treaty called the Convention concerning the Protection of the World Cultural and Natural Heritage, adopted by UNESCO in 1972.
- India has 38 world heritage sites that include 30 Cultural properties, 7 Natural properties and 1 mixed site.
- India's Natural World Heritage Sites are mentioned below:
  - Great Himalayan National Park Conservation Area (2014)
  - Kaziranga National Park (1985)
  - Keoladeo National Park (1985)
  - Manas Wildlife Sanctuary (1985)
  - Nanda Devi and Valley of Flowers National Parks (1988, 2005)
  - Sundarban National Park (1987)
  - Western Ghats (2012)

Therefore, option (b) is the correct answer.

10. Dachigam National Park is associated with which of the following? **UPPCS (Pre) 2018**

(a) Musk Deer
(b) Golden Oriole
(c) Yellow-throated Marten
(d) Hangul or Kashmir Stag

Answer: (d)

Explanation:

- Dachigam National Park is located 22 km from Srinagar in Jammu and Kashmir. It covers an area of 141 sq km. The name stands for 'ten villages', which is in memory of the ten villages that were relocated in order to create the park.
  - Dachigam was initially established to ensure the supply of clean drinking water to Srinagar city. A protected area since 1910, it was declared as a national park in 1981. The park is best known as the home of the Hangul or Kashmir stag.
  - Dachigam National Park is the only habitat area where Kashmir stag is found.
- Kashmir Stag locally known as Hangul is a sub-species of the European red deer. It is the only sub-species of red deer in India .
  - First identified by Alferd Wagner in 1844, the species is believed to have traveled all the way from Bukhara in Central Asia to Kashmir.
  - The animal is classified as 'critically endangered' by the International Union for Conservation of Nature (IUCN).
  - The challenges that Hangul faces include poaching, threats from insurgency and the border conflict between India and Pakistan.

Therefore, option (d) is the correct answer.

11. Which of the following pairs is ***not*** correctly matched?

UPPCS (Pre) 2018

(a) Bandipur National Park - Karnataka
(b) Manas Wildlife Sanctuary - Assam
(c) Periyar Wildlife Sanctuary - Kerala
(d) Similipal National Park - Madhya Pradesh

Answer: (d)

Explanation:

Wildlife Sanctuary/ National Park	Features
Bandipur National Park	❑ Located in Gundulpet taluk, Chamarajanagar district, Karnataka, Bandipur National Park has the second highest Tiger population in India. ❑ This park is the part of Nilgiri Biosphere Reserve making it the largest protected area in Southern India and largest habitat of Wild Elephants in South Asia. ❑ It shares its boundary with 3 other National parks namely Nagarhole National Park, Wayanad National Park and Mudumalai National park. ❑ Tigers, Indian Elephants, Leopard, Dhole, Sambar, Sloth bear, Chital many more animals and birds can be spotted in the Bandipur National park.
Manas Wildlife Sanctuary	❑ Located at the base of foot hills of the Bhutan-Himalayas in the state of Assam, Manas Wildlife Sanctuary is the first reserve included in the network of tiger reserves under Project Tiger in 1973. ❑ In 1985, the Manas Wildlife Sanctuary was inscribed as a World Heritage Site. ❑ Sankosh river in the west and Dhansiri in the east flows through it. ❑ The river Manas flows into the national Park from the gorges of Bhutan and split into two major streams of which the main water course comes out of the National Park about 30 km downstream is known as 'Beki". ❑ About half of the Park is covered by Grasslands of Terai and Bhabar type, the riparian (relating to or situated on the banks of a river) areas have colonizing grasslands and woodlands of several species. ❑ The thick woodlands are called Eastern Moist Deciduous Forests of various types. The undergrowths are very thick. There are more than 650 species of Angiosperms alone. The commonly seen trees are the Simul, Oxi, Sissoo, Khaie, Gamari, etc. ❑ Manas is the only landscape in the world where pristine Terai Grasslands are seen merging with the Bhabar grasslands interspersed with diverse habitats ascending to semi-evergreen forests and then to Bhutan Himalayas. ❑ The last population of the Pygmy Hog survive in the wilds of Manas and nowhere else in the world.
Periyar Wildlife Sanctuary	❑ Being located in Thekkady, Kerala, Periyar National Park and wildlife sanctuary is famous as an elephant and tiger reserve. ❑ One of the most renowned national parks in South India, it is set high at the Western Ghat ranges. ❑ It covers 357 square miles of land. Pamba and Periyar river runs through the park, which helps the flora and fauna to thrive in this region. ❑ The park is being adorned with a lake which is an artificial 100 years old lake at Thekkady and is basically known for its wild elephants and thickly established Western Ghats forests. ❑ Many of the intense valleys of Periyar contain tropical evergreen forest with extremely thick tree cover with hardly any sun-rays to get penetrated. ❑ Some of the areas in the park contain marshy grasslands near the edges of the lake and other water bodies. Spread out across the park are also patches of semi-evergreen forest used as important cover by many of the animal species.
Similipal National Park	❑ Simplipal (or Similipal) National Park is a protected area, under the care of Project Tiger. ❑ Similipal is situated in the Indian state of Odisha, just 200 km from Kolkata, and is one of the biggest areas in India enjoying a protected status. ❑ It is characterised by its stretches of stunning Sal Forests, scattered across a landscape of hills. Its name comes from the many Red Silk Cotton Trees that bloom vibrant colours across its expanses every year, giving it a characteristic colour and beauty.

Therefore, option (d) is the correct answer.

4 Environmental Pollution

1. Which of the following are the reasons/factors for exposure to benzene pollution? **UPSC CSE (Pre) 2020**

1. Automobile exhaust
2. Tobacco smoke
3. Wood burning
4. Using varnished wooden furniture
5. Using products made of polyurethane

Select the correct answer using the code given below:

(a) 1, 2 and3 only (b) 2 and 4 only
(c) 1, 3 and 4 only (d) 1, 2, 3, 4 and 5

Answer: (d)

Explanation:

- Benzene (C_6H_6) is a colorless, flammable liquid with a sweet odor. It evaporates quickly when exposed to air. Benzene is formed from natural processes, such as volcanoes and forest fires, but most of the exposure to benzene results from human activities.
- The main sources of benzene in the environment includes automobile exhaust, industrial sources, good buring and fuel evaporation from gasoline filling stations. **Hence, 1 and 3 are correct.**
- Benzene has been detected at high levels in indoor air. Although some of this exposure might be from building materials (paints, adhesives, etc.), but most is from cigarette smoke. **Hence, 2, 4 and 5 are correct.**

Therefore, option (d) is the correct answer.

2. Consider the following statements: **UPSC CSE (Pre) 2020**

1. Coal ash contains arsenic, lead and mercury.
2. Coal-fired power plants release sulphur dioxide and oxides of nitrogen into the environment.
3. High ash content is observed in Indian coal.

Which of the statement(s) given above is/are correct?

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

Answer: (d)

Explanation:

- Coal ash, also referred as coal combustion residuals or CCRs, is produced primarily from the burning of coal in coal-fired power plants. It contains contaminants like mercury, cadmium and arsenic. Without proper management, these contaminants can pollute waterways, ground water, drinking water, and the air. **Hence, statement 1 is correct.**
- Coal based thermal power plants are major source of Sulphur dioxide and Nitrogen oxides emissions. **Hence, statement 2 is correct.**
- According to Coal India Limited, the ash content of coal produced in the country is generally 25 to 45% whereas average ash content of imported coal varies from 10 to 20%. **Hence, statement 3 is correct.**

Therefore, option (d) is the correct answer.

3. With reference to Eutrophication, which of the following statement(s) is/are correct? **UPPCS (Pre) 2020**

1. It decreases dissolved oxygen of water.
2. It is a phenomenon of nutrient enrichment of a water body.

Select the correct answer from the codes given below.

Codes:

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

Answer: (c)

Explanation:

- Eutrophication is when a water body becomes overly enriched with minerals and nutrients which induce excessive growth of algae or algal bloom.This process also results in oxygen depletion of the water body. **Hence, statements 1 and 2 are correct.**
- Eutrophication is a leading cause of impairment of many freshwater and coastal marine ecosystems in the world. Harmful algal blooms, dead zones, and fish kills are also the results of eutrophication.

Therefore, option (c) is the correct answer.

4. Why is there a great concern about the 'microbeads' that are released into environment? **UPSC CSE (Pre) 2019**

(a) They are considered harmful to marine ecosystems.
(b) They are considered to cause skin cancer in children.
(c) They are small enough to be absorbed by crop plants in irrigated fields.
(d) They are often found to be used as food adulterants.

Answer: (a)

Explanation:

- Microbeads are small, solid, manufactured plastic particles that are less than 5mm and do not degrade or dissolve in water.
- Mainly made of polyethylene, microbeads can also be prepared from petrochemical plastics such as polystyrene and polypropylene. They may be added to a range of products, including rinse-off cosmetics, personal care and cleaning products.
- Microbeads, because of their small size pass unfiltered through the sewage treatment system and reach the water bodies. The untreated microbeads in thewater bodies are taken up by the marine animals, thus producing toxicity and causing harm to the marine ecosystem.
- In 2014, Netherland became the first country to ban cosmetics microbeads.

Therefore, option (a) is the correct answer.

5. Consider the following: **UPSC CSE (Pre) 2019**

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into atmosphere due to the burning of crop/biomass residue?

(a) 1 and 2 only (b) 2, 3 and 4 only
(c) 1 and 4 only (d) 1, 2, 3 and 4

Answer: (d)

Explanation:

- Biomass is organic material that comes from plants and animals, and it is a renewable source of energy. Biomass contains stored energy from the Sun. Plants absorb the Sun's energy in a process called photosynthesis. When biomass is burned, the chemical energy in biomass is released as heat.
- Crop residue and biomass burning (forest fires) is considered as a major source of Carbon Dioxide (CO_2), Carbon Monoxide (CO), Methane (CH_4), volatile organic compounds (VOC), and Nitrogen Oxides(NO_x). Burning of paddy crop residue releases Suspended Particulate Matter, SO_2 and NO_2 in the atmosphere. **Hence, 1, 2, 3 and 4 are correct.**

Therefore, option (d) is the correct answer.

6. Which of the following statements is/are correct about the deposits of'methanehydrate'? **UPSC CSE (Pre) 2019**

1. Global warming might trigger the release of methane gas from these deposits.
2. Large deposits of 'methanehydrate' are found in Arctic Tundra and under the sea floor.
3. Methane in atmosphere oxidizes to carbon dioxide after a decade or two.

Select the correct answer using the code given below.

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

Answer: (d)

Explanation:

- Methanehydrate is a crystalline solid that consists of a methane molecule surrounded by a cage of interlocking water molecules. It is an "ice" that only occurs naturally in subsurface deposits where temperature and pressure conditions are favorable for its formation.
- Regions with suitable temperature and pressure conditions for the formation and stability of methane hydrate– sediment and sedimentary rock units below the Arctic permafrost; sedimentary deposits along continental margins; deep-water sediments of inland lakes and seas; and, under Antarctic ice. **Hence, statement 2 is correct.**
- Methane hydrates, the sensitive sediments, can rapidly dissociate with an increase in temperature or a decrease in pressure. The dissociation produces free methane and water, which can be triggered by global warming. **Hence, statement 1 is correct.**
- Methane is removed from the atmosphere in about 9 to 12-year period by oxidation reaction where it is converted into Carbon dioxide. **Hence, statement 3 is correct.**

Therefore, option (d) is the correct answer.

7. Consider the following statements: **UPSC CSE (Pre) 2019**

1. Agricultural soils release nitrogen oxides into environment.
2. Cattle release ammonia into environment.
3. Poultry industry releases reactive nitrogen compounds into environment.

Which of the statement(s) given above is/are correct?

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

Answer: (d)

Explanation:

- According to FAO, poultry manure releases considerable amounts of Nitrogen mainly in form of Ammonia (NH_3), Dinitrogen (N_2), Nitrous Oxide (N_2O) and Nitrate(NO_3–). **Hence, statement 3 iscorrect.**
- According to FAO, major forms of pollution associated with intensive livestock production include eutrophication of surface water, leaching of Nitrates and pathogens, and release of Ammonia, Methane and other gases into the air. **Hence, statement 2 is correct.**
- A range of pollutant gases, and especially nitrogen compounds (NO_2, NO, NH_3, N_2O) are emitted to the atmosphere from agricultural activities, including fertilizer use, farm machinery and livestock waste. **Hence, statement 1 is correct.**

Therefore, option (d) is the correct answer.

8. The National Clean Air Programme (NCAP) aims to reduce particulate matter (PM) in at least 102 cities of India by 20% - 30% by 2024. The base year for the comparison of concentration is: **CAPF (ACs) Exam 2019**

(a) 2015 (b) 2016

(c) 2017 (d) 2018

Answer: (c)

Explanation:

- The National Clean Air Programme (NCAP) was launched by the the Ministry of Environment, Forest and Climate Change (MoEFCC) in 2019 to cut the concentration of coarse (particulate matter of diameter 10 micrometer or less, or PM10) and fine particles (particulate matter of diameter 2.5 micrometer or less, or PM2.5) by at least 20% -30% by 2024, with 2017 as the base year for comparison of concentration.
- The plan includes 102 non-attainment cities, across 23 states and Union territories, which were identified by the Central Pollution Control Board (CPCB) on the basis of their ambient air quality data between 2011 and 2015.
  - Non-attainment cities are those that have fallen short of the National Ambient Air Quality Standards (NAAQS) for over five years.

Therefore, option (c) is the correct answer.

9. Catalytic converter transforms waste gases from the engines of many cars into carbon dioxide, nitrogen and water. The catalyst is made of: **CISF AC (EXE) LDCE 2019**

(a) platinum and copper

(b) molybdenum and copper

(c) platinum and rhodium

(d) rhodium and molybdenum

Answer: (c)

Explanation:

Catalytic converter is an exhaust emission control device made of platinum and rhodium which helps in reduction of toxic gases and pollutants from the engines of cars into less toxic pollutants like carbon dioxide, nitrogen and water by catalyzing a redox reaction.

Therefore, option (c) is the correct answer.

10. Venturi scrubber, a device used to remove particulate matter from the atmosphere, works on the principle of: **CISF AC (EXE) LDCE 2019**

(a) Settling by gravitational force

(b) Removal by centrifugal force

(c) Removal by electrically charged particles

(d) Removal by atomized water vapour

Answer: (d)

Explanation:

- Venturi scrubber is a type of pollution control equipment that is used to remove contaminated particles (primarily particulate matters) from gaseous exhaust streams. It works on the principle of removal by atomized water vapour.
- It is a part of the group of air pollution control technologies collectively referred to as wet scrubbers and uses the energy from a high-velocity inlet gas stream to atomize the liquid being used to scrub the gas stream.

Therefore, option (d) is the correct answer.

11. Acid rain results when gaseous emissions of Sulfur oxides (SO_x) and nitrogen oxides (NO_x) interact with water vapour and: **Engineering Services (Pre) Exam 2019**

(a) Moonlight, and are chemically converted to strong acidic compounds such as sulfuric acid (H_2SO_4) and nitric acid (HNO_3)

(b) Sunlight, and are chemically converted to strong acidic compounds such as sulfuric acid (H_2SO_4) and nitric acid (HNO_3)

(c) Moonlight, and are chemically converted to weak acidic compounds such as sulfuric acid (H_2SO_4) and nitric acid (HNO_3)

(d) Sunlight, and are chemically converted to weak acidic compounds such as sulfuric acid (H_2SO_4) and nitric acid (HNO_3)

Answer: (b)

Explanation:

- Acid rain results when sulfur dioxide (SO_2) and nitrogen oxides (NO_x) are emitted into the atmosphere, react with water, oxygen and other chemicals in the presence of sunlight to form sulfuric and nitric acids, which then falls to the ground in the form of wet or dry deposition.

- As the pH level of the precipitation is less than 5.6, it can severely affect flora and fauna in the region.

Therefore, option (b) is the correct answer.

12. With reference to Eutrophication, which of the following statements is/are correct? **UPPCS (Pre) 2019**

1. It is a phenomenon of nutrient enrichment of a water body.
2. It depletes dissolved oxygen of the water.

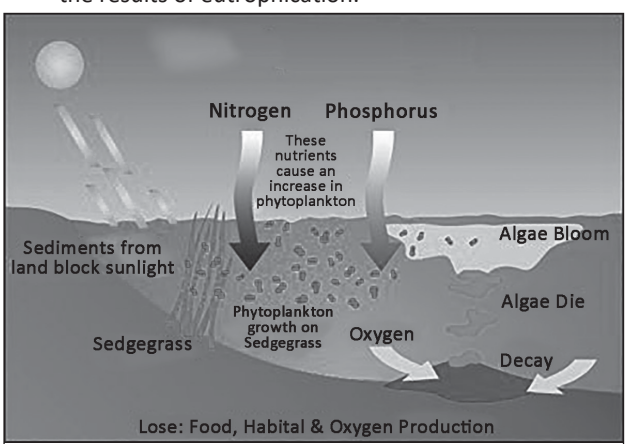
Codes:

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

Answer: (c)

Explanation:

- Eutrophication is a process when a water body becomes overly enriched with minerals and nutrients which induce excessive growth of algae or algal bloom.This process also results in oxygen depletion of the water body. **Hence, statements 1 and 2 are correct.**
- Eutrophication is a leading cause of impairment of many freshwater and coastal marine ecosystems in the world. Harmful algal blooms, dead zones, and fish kills are also the results of eutrophication.



Eutrophication

- **Process of Eutrophication**
  - Fertilisers, untreated sewage and other nutrient rich run-off go into nearby water causing an increase in nutrient levels. This causes phytoplankton to grow and reproduce more rapidly, resulting in algal blooms. This bloom of algae disrupts normal ecosystem functioning.
  - The algae take up all the oxygen in the water, leaving none for other marine life. This results in the death of many aquatic organisms such as fish, which need the oxygen in the water to live. The bloom of algae may also block sunlight from photosynthetic marine plants under the water surface.
  - When these dense algal blooms eventually die, microbial decomposition severely depletes dissolved oxygen, creating a hypoxic or anoxic 'dead zone' lacking sufficient oxygen to support most organisms. This leads to eventual degradation of aquatic ecosystems.

Therefore, option (c) is the correct answer.

13. Which of the following is the well known example of bioindicator of air pollution? **UPPCS (Pre) 2019**

(a) Lichens (b) Methyl Mercury
(c) Rose Plant d) Sunflower

Answer: (a)

Explanation:

- A bioindicator is a living organism that gives us an idea of the health of an ecosystem. It is also known as the health indicator of the ecosystem.
- Lichens are a complex life form, living in a symbiotic partnership between fungus and alga. It can be used as air pollution indicator, especially of the concentration of sulphur dioxide in the atmosphere.
- They are sensitive to sulphur dioxide (SO_2) and do not grow in polluted areas. Monitoring population numbers of lichens might indicate damage to the ecosystem in which they live.
- Lichens live on the surfaces such as trees, rocks, soil etc. Lichens do not have roots; instead they receive all their nutrients from the atmosphere.

Therefore, option (a) is the correct answer.

14. Smog is essentially caused by the atmospheric presence of **UPPCS (Pre) 2019**

(a) Oxygen and ozone
(b) Ozone and nitrogen
(c) Oxygen and nitrogen
(d) Oxide of nitrogen and sulphur

Answer: (d)

Explanation:

- Smog is a specific type of air pollution. It is a combination of harmful pollutants (often appearing relatively low to the ground as a yellow-brown haze) that are introduced into the atmosphere by both natural and human induced processes.
- The term Smog is used to describe a mix of smoke and fog. It is majorly a composition of sulphur oxides, nitrogen oxides and hydrocarbon vapours emitted by automobiles. The smog causes a light brownish coloration of the atmosphere, reduced visibility, plant damage, irritation of the eyes and respiratory distress.

Therefore, option (d) is the correct answer.

15. The gas, which is emitted in the paddy fields and increases the earth's temperature is **UPPCS (Pre) 2019**

(a) Nitrogen (b) Carbon dioxide
(c) Carbon monoxide (d) Methane

Answer: (d)

Explanation:

- Wetland rice fields (Paddy fields) have been identified as a major source of atmospheric methane. Although the potential for methane release from rice fields has long been noted, the first comprehensive measurements of methane fluxes in rice fields were reported only in the early 1980s. As in a natural wetland, flooding a rice field cuts off the oxygen supply from the atmosphere to the soil, which results in anaerobic fermentation of soil organic matter.
- Methane is a major end product of anaerobic fermentation. It is released from submerged soils to the atmosphere by diffusion and ebullition (the action of bubbling or boiling) and through roots and stems of rice plants. Global estimates of emission rates of methane from wetland rice fields range from 20 to 100 Tg/yr (IPCC 1992), which corresponds to 6-29% of the total annual anthropogenic methane emission.

Therefore, option (d) is the correct answer.

16. Which of the following statements about India's largest Charkha is/are true? **UPPCS (Pre) 2019**

1. It was inaugurated in Noida.
2. It is made of used plastic waste.

Select the correct answer from the codes given below:

Codes:

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

Answer: (c)

Explanation:

- A spinning wheel was inaugurated at Gautam Buddh Nagar, Noida by Union Government and Noida Authority. The 'charkha', which symbolises Gandhi's dream of Swadeshi (self sufficiency and self reliance), measures 14 ft × 20 ft × 8ft and is made of 1,250 kg of used plastic. **Hence, statements 1 and 2 are correct.**
- It was inaugurated on Mahatma Gandhi's 150th birth anniversary.
- The gigantic spinning wheel is not only representative of construction and beautification but also represents our commitment towards the plastic-free campaign. It has been recognised as the largest made of used plastic waste in the country by India Book of Records.

Therefore, option (c) is the correct answer.

17. Which of the following has/have shrunk immensely/dried up in the recent past due to human activities? **UPSC CSE (Pre) 2018**

1. Aral Sea 2. BlackSea
3. Lake Baikal

Select the correct answer using the code given below:

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

Answer: (a)

Explanation:

- **Aral Sea:** It lies between Kazakhstan and Uzbekistan. It has been shrinking steadily since the 1960s after its tributaries were diverted by Soviet irrigation projects. By 2007, the lake had declined to 10% of its original size and had split into four separate lakes. **Hence, 1 is correct.**
- **Black Sea:** It is also known as Euxine Sea. It is one of the major water bodies and a famous inland sea of the world. The countries sharing a border with the Black Sea include Romania, Turkey, Bulgaria, Ukraine, Russia, and Georgia. There has been no dramatic shrinkage of the Black Sea in the recent past. **Hence, 2 is not correct.**
- **Lake Baikal:** Located in Siberian Russia, this UNESCO World Heritage site has not undergone any dramatic shrinkage in the recent past. One of the most recognizable shifts affecting Lake Baikal is the rapidly increasing number of Spirogyra, a diverse form of algae. **Hence, 3 is not correct.**

Therefore, option (a) is the correct answer.

18. The term "sixth mass extinction/sixth extinction" is often mentioned in the news in the context of the discussion of **UPSC CSE (Pre) 2018**

(a) Widespread monoculture practices in agriculture and large-scale commercial farming with indiscriminate use of chemicals in many parts of the world that may result in the loss of good native ecosystems.
(b) Fears of a possible collision of a meteorite with the Earth in the near future in the manner it happened 65 million years ago that caused the mass extinction of many species including those of dinosaurs.
(c) Large scale cultivation of genetically modified crops in many parts of the world and promoting their cultivation in other parts of the world which may cause the disappearance of good native crop plant sand the loss of food biodiversity.
(d) Mankind's over-exploitation/misuse of natural resources, fragmentation/loss of natural habitats, destruction of ecosystems, pollution and global climate change.

Answer: (d)

5 Climate Change

1. Which one of the following statements best describes the term 'Social Cost of Carbon'? **UPSC CSE (Pre) 2020**

It is a measure, in monetary value, of the

(a) long-term damage done by a tonne of CO_2 emissions in a given year.

(b) requirement of fossil fuels for a country to provide goods and services to its citizens, based on the burning of those fuels.

(c) efforts put in by a climate refugee to adapt to live in a new place.

(d) contribution of an individual person to the carbon footprint on the planet Earth.

Answer: (a)

Explanation:

- The social cost of carbon (SCC) is an estimate, in dollars, of the economic damages that would result from emitting one additional ton of greenhouse gases into the atmosphere.
- The SCC puts the effects of climate change into economic terms to help policymakers and other decision makers understand the economic impacts of decisions that would increase or decrease emissions.
- India's country-level social cost of carbon emission was estimated to be the highest at $86 per tonne of CO_2. It means the Indian economy will lose $86 by emitting each additional tonne of CO_2. India is followed by the US ($48) and Saudi Arabia ($47).

Therefore, option (a) is the correct answer.

2. Which one of the following is ***not*** a greenhouse gas found naturally in the atmosphere? **UPPCS (Pre) 2020**

(a) Nitrogen oxide (b) Carbon dioxide

(c) Methane (d) Ozone

Answer: (a)

Explanation:

- Many chemical compounds present in Earth's atmosphere behave as 'greenhouse gases'. These are gases which allow direct sunlight (relative shortwave energy) to reach the Earth's surface unimpeded. As the shortwave energy (that in the visible and ultraviolet portion of the spectra) heats the surface, longer-wave (infrared) energy (heat) is reradiated to the atmosphere. Greenhouse gases absorb this energy, thereby allowing less heat to escape back to space, and 'trapping' it in the lower atmosphere.
- Many greenhouse gases occur naturally in the atmosphere, such as carbon dioxide, methane, ozone, water vapor, and nitrous oxide, while others are synthetic.
- Some gases such as nitrogen oxide, chloroflurocarbons, hydrofluorocarbons etc., are released into the atmosphere due to anthropogenic causes. Nitrogen oxide is not found naturally and are relesed from internal combustion engines of automobiles.

Therefore, option (a) is the correct answer.

3. Which of the following are the impacts of Global Warming? **UPPCS (Pre) 2020**

1. Rise in sea level
2. Melting of glaciers
3. Spread of diseases
4. Bleaching of Coral reefs

Select the correct answer using the codes given below:

Codes:

(a) 1, 2 and 3 only (b) 2 and 3 only

(c) 1, 3 and 4 only (d) 1, 2, 3 and 4

Answer: (d)

Explanation:

- "Global Warming" refers to the long-term warming of the planet.
- **Impacts of Global Warming**
  - **Melting of glaciers:** Since the early 1900s, many glaciers around the world have been rapidly melting. Human activities are at the root of this phenomenon. Specifically, since the industrial revolution, carbon dioxide and other greenhouse gas emissions have raised temperatures, even higher in the poles, and as a result, glaciers are rapidly melting, calving off into the sea and retreating on land. **Hence, 2 is correct.**

- **Sea Level Rise:** Global sea level has risen by about 8 inches since reliable record keeping began in 1880. It is projected to rise another 1 to 4 feet by 2100. Melting glaciers add to rising sea levels, which in turn increases coastal erosion and elevates storm surge as warming air and ocean temperatures create more frequent and intense coastal storms like hurricanes and typhoons. **Hence, 1 is correct.**
- **Effect on the Oceans:** As greenhouse gases trap more energy from the sun, the oceans are absorbing more heat, resulting in an increase in sea surface temperatures and rising sea level. further the ocean has become more acidic over the past few decades because of increased levels of atmospheric carbon dioxide, which dissolves in the water. Higher acidity affects the balance of minerals in the water, which can make it more difficult for certain marine animals to build their protective skeletons or shells.
- **Coral Bleaching:** An effect of global warming is increased coral bleaching. Coral bleaching is when unicellular organisms that help make up the coral begin to die off and leave the coral giving it a white appearance. These unicellular organisms are important for the coral to feed and get the proper nutrition that is necessary to survive. Slight increase in temperature also affects their survival.**Hence, 4 is correct.**
- **Disease Burden:** Diseases are likely to spread from the tropics to the temperate and northern regions as the climate warms. Outbreaks of pests may become more extreme. **Hence, 3 is correct.**

Therefore, option (d) is the correct answer.

4. India aims to achieve land degradation neutrality by the year: **UPPCS (Pre) 2019**

(a) 2025 (b) 2030

(c) 2035 (d) 2040

Answer: (b)

Explanation:

- The United Nations Convention to Combat Desertification (UNCCD) is an international agreement on good land stewardship. It helps people, communities and countries to create wealth, grow economies and secure enough food and water and energy, by ensuring land users have an enabling environment for sustainable land management.
- Through partnerships, the Convention's 197 Parties set up robust systems to manage drought promptly and effectively. Good land stewardship based on a sound policy and science helps integrate and accelerate the achievement of the Sustainable Development Goals, builds resilience to climate change and prevents biodiversity loss.
- India is a signatory to the United Nations Convention for Combating Desertification (UNCCD). The Ministry of Environment, Forest and Climate Change (MoEFCC) is the nodal Ministry of Government of India that oversees implementation of the Convention in the country.
- India was one of the first countries to commit to the 2030 Sustainable Development Goal target of achieving land degradation neutrality (LDN).

Therefore, option (b) is the correct answer.

5. With reference to the Deep Carbon Observatory (DCO) which of the following statements is/are correct? **UPPCS (Pre) 2019**

1. It is a Global Research Programme to outreach the role of carbon on earth.
2. It conducts field observations of deep microbial ecosystems.

Select the Correct answer using the codes given below:

Codes:

(a) 1 only (b) 2 only

(c) Both 1 and 2 (d) Neither 1 nor 2

Answer: (c)

Explanation:

- The Deep Carbon Observatory (DCO) is a global research program designed to transform understanding of carbon's role in Earth. It is a community of scientists, including biologists, physicists, geoscientists and chemists, whose work crosses several traditional disciplinary lines to develop the new, integrative field of deep carbon science. **Hence, statement 1 is correct.**
- The Deep Carbon Observatory's research considers the global carbon cycle beyond Earth's surface. It explores high-pressure and extreme temperature organic synthesis, complex interactions between organic molecules and minerals, conducts field observations of deep microbial ecosystems and of anomalies in petroleum geochemistry, and constructs theoretical models of lower crust and upper mantle carbon sources and sinks. **Hence, statement 2 is correct.**
- Considerable amounts of life forms, including 70% of bacteria and archaea on Earth, comprising up to 23 billion tonnes of carbon, live up to at least 4.8 km (3.0 mi) deep underground, including 2.5 km (1.6 mi) below the seabed, according to a ten-year Deep Carbon Observatory project.

Therefore, option (c) is the correct answer.

6. Which of the following is/are considered as India's green Initiative(s)? **CAPF (ACs) Exam 2018**

1. National Green Highway Mission
2. R&D for Clean Coal Technologies
3. National Green Corridor Programme

Select the correct answer using the code given below:

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

Answer: (d)

Explanation:

- Union Minister of Road Transport & Highways and Shipping launched the Green Highways (Plantation, Transplantation, Beautification & Maintenance) Policy in 2015, to promote greening of Highway corridors with participation of the community, farmers, private sector, NGOs and government institutions. **Hence, statement 1 is correct.**
- Government of India through Department of Science & Technology, has set up the National Centre for Clean Coal Research and Development (NCCCR&D) as a national level consortium on clean coal R&D, led by the Indian Institute of Science (IISc)-Bengaluru. The primary goal is to address several critical R&D challenges towards the development of clean coal technologies. **Hence, statement 2 is correct.**
- The green energy corridor is a grid connected network for the transmission of renewable energy produced from various renewable energy projects. The project is envisaged by state owned Power Grid Corporation of India Limited (PGCIL) in its innovative report titled 'Green Energy Corridors'. **Hence, statement 3 is correct.**

Therefore, option (d) is the correct answer.

7. Which one of the following statements about the National Adaptation Fund for Climate Change is ***not*** correct? **CDS Exam (I) 2018**

(a) The fund is meant to assist national and State level activities to meet the cost of adaptation measures.
(b) This scheme has been taken as a Central Sector Scheme.
(c) The Indian Council of Agricultural Research is the national implementing entity for the fund.
(d) The scheme has been in force since 2015-2016.

Answer: (c)

Explanation:

- The National Adaptation Fund for Climate Change (NAFCC) is a Central Sector Scheme set up in the year 2015-16. The main objective of NAFCC is to support concrete adaptation activities which mitigates the adverse effects of climate change.
- The activities under this scheme are implemented in a project mode. The projects related to adaptation in sectors such as agriculture, animal husbandry, water, forestry, tourism etc. are eligible for funding under NAFCC. National Bank for Agriculture and Rural Development (NABARD) is the National Implementing Entity (NIE).

Therefore, option (c) is the correct answer.

8. 'Vegetation is the true index of climate'. This statement is associated with **UPPCS (Pre) 2018**

(a) Thornthwaite (b) Koppen
(c) Trewartha (d) Stamp

Answer: (b)

Explanation:

- 'Vegetation is the true index of climate' is associated with Koppen. The Koppen climate classification is one of the most widely used climate classification systems. It was first published by the German-Russian climatologist, Wladimir Koppen (1846–1940), in 1884. He recognized a close relationship between the distribution of vegetation and climate.
- Koppen selected specific values of temperature and precipitation and related them to the distribution of vegetation and used these values for classifying the climates. The Koppen climate classification system divides the world into five climate zones based on criteria, usually temperature, which allows for different vegetation growth. The zones are as follows:
  - Zone A: Tropical or equatorial zone
  - Zone B: Arid or dry zone
  - Zone C: Warm/mild temperate zone
  - Zone D: Continental zone
  - Zone E: Polar zone

Therefore, option (b) is the correct answer.

9. As a result of global warming the frequency and severity of which of the following are increasing due to global warming? **UPPCS (Pre) 2018**

(a) Cyclones only (b) Storms only
(c) Hurricanes only (d) All of the above

Answer: (d)

Explanation:

- Global warming is increasing the surface temperature of seas, making it more prone to cyclones. The intensity of tropical cyclones has increased globally in recent decades.

- With increasing global surface temperatures the possibility of more droughts and increased intensity of storms will likely occur. As more water vapor is evaporated into the atmosphere it becomes fuel for more powerful storms to develop. More heat in the atmosphere and warmer ocean surface temperatures can lead to increased wind speeds in tropical storms. Many tropical cyclone-prone regions of the world are expected to experience storm systems of greater intensity over the coming century.
- Further there is evidence that climate change due to global warming is probably fueling more powerful hurricanes and typhoons, a trend that is expected to continue as global temperatures rise, amounting to a roughly 5% increase in maximum wind speeds if the globe warms by 2 degrees Celsius.

Therefore, option (d) is the correct answer.

10. 'Saving energy and other resources for the future without sacrificing people's comfort in the present' is the definition of which of the following concepts? **UPPCS (Pre) 2018**

(a) Economic growth
(b) Economic development
(c) Sustainable development
(d) Human development

Answer: (c)

Explanation:

- Sustainable Development is defined as the development which meets the needs of the present without compromising the ability of future generations to meet their own needs.
- This most widely accepted definition of Sustainable Development, was given by the Brundtland Commission in its report Our Common Future (1987).

Therefore, option (c) is the correct answer.

11. What is 'Green House Effect'? **UPPCS (Pre) 2018**

(a) Increase in global temperatures
(b) Decrease in global temperatures
(c) Increase in sea water temperatures
(d) Increase in temperature of rivers and lakes

Answer: (a)

Explanation:

- The greenhouse effect is a natural process that warms the Earth's surface. When the Sun's energy reaches the Earth's atmosphere, some of it is reflected back to space and the rest is absorbed and re-radiated by greenhouse gases.
- Greenhouse gases include water vapour, carbon dioxide, methane, nitrous oxide, ozone and some artificial chemicals such as chlorofluorocarbons (CFCs).
  - The problem we face is that human activities, particularly burning fossil fuels (coal, oil and natural gas), agriculture and land clearing are increasing the concentrations of greenhouse gases. This is the enhanced greenhouse effect, which is also contributing to warming of the Earth.

Therefore, option (a) is the correct answer.

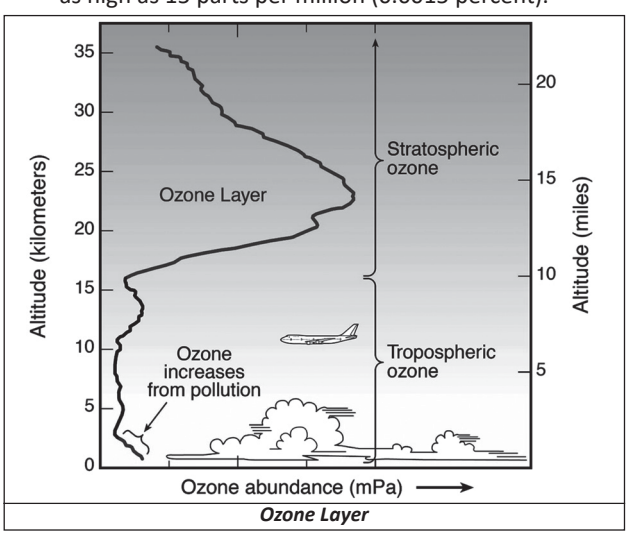
12. The maximum concentration of ozone is found in which of the following? **UPPCS (Pre) 2018**

(a) Troposphere
(b) Mesosphere
(c) Stratosphere
(d) Exosphere

Answer: (c)

Explanation:

- Ozone is a gas made up of three oxygen atoms (O_3). It occurs naturally in small amounts in the upper atmosphere (the stratosphere). Ozone protects life on Earth from the Sun's ultraviolet (UV) radiation. In the lower atmosphere (the troposphere) near the Earth's surface, ozone is created by chemical reactions between air pollutants from vehicle exhaust, gasoline vapours, and other emissions. At ground level, high concentrations of ozone are toxic to people and plants.
- Ninety percent of the ozone in the atmosphere sits in the stratosphere. The natural level of ozone in the stratosphere is a result of a balance between sunlight that creates ozone and chemical reactions that destroy it.
- The peak concentration of ozone occurs at an altitude of roughly 32 kilometres (20 miles) above the surface of the Earth. At that altitude, ozone concentration can be as high as 15 parts per million (0.0015 percent).



Therefore, option (c) is the correct answer.

13. When was India's first National Action Plan on Climate Change released? **UPPCS (Pre) 2018**

(a) 2000 (b) 2008

(c) 2012 (d) 2015

Answer: (b)

Explanation:

- India released its first National Action Plan on Climate Change (NAPCC) to mitigate and adapt to climate change on June 30th, 2008.
- It aims at creating awareness among the representatives of the public, different agencies of the government, scientists, industry and the communities on the threat posed by climate change and the steps to counter it.
- There are 8 national missions forming the core of the NAPCC which represent multi-pronged, long term and integrated strategies for achieving key goals in climate change. These are:
  - National Solar Mission
  - National Mission for Enhanced Energy Efficiency
  - National Mission on Sustainable Habitat
  - National Water Mission
  - National Mission for Sustaining the Himalayan Ecosystem
  - National Mission for A Green India
  - National Mission for Sustainable Agriculture
  - National Mission on Strategic Knowledge for Climate Change.

Therefore, option (b) is the correct answer.

14. Which of the following countries was the largest emitter of CO_2 in 2015 ? **UPPCS (Pre) 2018**

(a) China (b) U.S.A.

(c) India (d) France

Answer: (a)

Explanation:

- Carbon dioxide (CO_2) is an odorless gas that is highly important to life on Earth. It is also known as a greenhouse gas; an excessive concentration of it can disrupt the natural regulation of temperature in the atmosphere and lead to global warming.
- China is the world's largest emitter of CO_2, a trend that has steadily risen over the years, now producing 10.06 billion metric tons of CO_2.
- As per the second Global Energy and CO_2 Status Report , China, the United States, and India together accounted for nearly 70% of the rise in energy demand. These countries also accounted for 85% of the net increase in CO_2 emissions.

Therefore, option (a) is the correct answer.

15. Which one of the following greenhouse gases is in largest concentration in the atmosphere? **NDA & NA Exam (II) 2018**

(a) Chlorofluorocarbon (b) Nitrous oxide

(c) Carbon dioxide (d) Methane

Answer: (c)

Explanation:

- Carbon dioxide is the main long-lived greenhouse gas in the atmosphere related to human activities. It remains in the atmosphere for centuries and in the oceans for even longer.
- As per the WMO (World Meteorological Organization) Greenhouse Gas Bulletin, 2017.
  - The concentration of carbon dioxide was at 405.5 ppm, and methane at 1859 ppb.
  - The concentration of chloroflorocarbon has been gradually decreasing since 2017

Therefore, option (c) is the correct answer.

16. Presence of ozone in the atmosphere is important because it absorbs: **CAPF (ACs) Exam 2017**

(a) Ultraviolet-A and ultraviolet-B radiations

(b) Ultraviolet-B radiations only

(c) Infrared-B radiations only

(d) Outgoing ultraviolet-B radiations and incoming ultraviolet-A radiations

Answer: (b)

Explanation:

- The ozone layer is a region of high ozone concentration in the stratosphere, 15 to 35 kilometres above Earth's surface. The ozone layer acts as an invisible shield and protects us from harmful ultraviolet (UV) radiation from the sun.
- In particular, the ozone layer protects us from the UV radiation, known as UV-B, which causes sunburn. Ozone absorbs UV-B radiation from the sun in the stratosphere and prevents harmful levels of this radiation from reaching Earth's surface.
- Long-term exposure to high levels of UV-B threatens human health and damages most animals, plants and microbes, so the ozone layer protects all life on Earth.

Therefore, option (b) is the correct answer.

17. In March 2017, a High Court in India had accorded the status of living human entities to which of the following rivers? **CAPF (ACs) Exam 2017**

(a) Brahmaputra and Ganga (b) Ganga and Yamuna

(c) Yamuna and Godavari (d) Krishna and Kaveri

Answer: (b)

6 Environmental Issues & Sustainable Development

1. In rural road construction, the use of which of the following is preferred for ensuring environmental sustainability or to reduce carbon foot-print?

UPSC CSE (Pre) 2020

1. Copper Slag
2. Cold mix asphalt technology
3. Geotextiles
4. Hot mix asphalt technology
5. Portland Cement

Select the correct answer using the code given below:

(a) 1, 2 and 3 only (b) 2, 3 and 4 only
(c) 4 and 5 only (d) 1 and 5 only

Answer: (a)

Explanation:

- Copper slag is a by-product obtained during smelting and refining of copper. The waste copper slag can be used as an abrasive tool, road construction and ballast. The use of copper slag in cement and concrete provides potential environmental as well as economic benefits for all related industries, particularly in areas where a considerable amount of copper slag is produced. **Hence, 1 is correct**.
- Cold mix asphalt is produced by mixing unheated mineral aggregate with either emulsified bitumen or foamed bitumen. Cold asphalt mixes are typically suitable for light to medium trafficked roads when used in base and surface courses. **Hence, 2 is correct**.
- Geotextile is a synthetic permeable textile material used to improve the soil characteristics and has the ability to separate, filter, reinforce, protect and drain when used in association with soils. It is mostly used for filtration and separation in the road constructions. **Hence, 3 is correct**.
- Hot Mix Asphalt (HMA) is a combination of approximately 95% stone, sand, or gravel bound together by asphalt cement, a product of crude oil. The wide use of hot mix technology leads to environmental pollution as these plants emit a huge amount of greenhouse gases. **Hence, 4 is not correct**.
- Portland cement is a binding material in the form of a finely ground powder, that is manufactured by burning and grinding a mixture of limestone and clay. Its production generates greenhouse gases. **Hence, 5 is not correct**.

Therefore, option (a) is the correct answer.

2. Consider the following statements:

UPSC CSE (Pre) 2020

1. 36% of India's districts are classified as "overexploited" or "critical" by the Central Ground Water Authority (CGWA).
2. CGWA was formed under the Environment (Protection) Act.
3. India has the largest area under groundwater irrigation in the world.

Which of the statements given above is/are correct?

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

Answer: (b)

Explanation:

- Based on groundwater levels, areas across the country are split into three categories: Over-exploited, Critical and Semi critical. The first refers to groundwater being extracted more than what is recharged i.e., extraction is more than 100%. Critical is where the groundwater taken out is 90-100% of what is recharged and semi-critical is where extraction rate is 70%-90%.
- As per the report 'National Compilation on Dynamic Groundwater Resources of India, 2017' of CGWA, out of the total 6881 assessment units (Blocks/Mandals/Talukas) in the country, 1186 units in various States (17%) have been categorised as 'Over-Exploited', 313 units (5%) are 'Critical', and 972 are semi-critical units (14%). **Hence, statement 1 is not correct**.
- The Central Ground Water Authority (CGWA) was constituted under Section 3(3) of the Environment (Protection) Act, 1986 to regulate, control, develop, and manage the ground-water resources. **Hence, statement 2 is correct**.

- As per the report of Food and Agriculture Organization (FAO),the countries with the largest extent of areas equipped for irrigation with groundwater, in absolute terms are India (39 million ha), China (19 million ha) and the USA (17 million ha). **Hence, statement 3 is correct**.

Therefore, option (b) is the correct answer.

3. With reference to solar water pumps, consider the following statements: **UPSC CSE (Pre) 2020**

1. Solar power can be used for running surface pumps and not for submersible pumps.
2. Solar power can be used for running centrifugal pumps and not the ones with piston.

Which of the statement(s) given above is/are correct?

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

Answer: (d)

Explanation:

- The main components in a solar pumping system include a photovoltaic (PV) array, an electric motor and a pump.
- There are several different types of solar-powered pumps depending on their functional mechanism. But primarily there are four types of solar water pumps - submersible pumps, surface pumps, direct current (DC) pumps and alternate current (AC) pumps. **Hence, statement 1 is not correct**.
- Solar Power can be used to run both centrifugal as well as piston pumps. **Hence, statement 2 is not correct.**

Therefore, option (d) is the correct answer.

4. Which one among the following was the first country to declare Climate Emergency? **CAPF (ACs) Exam 2019**

(a) Sweden (b) New Zealand
(c) UK (d) Ireland

Answer: (c)

Explanation:

On the 1st of May, 2019, the UK Parliament declared an environmental and climate emergency, becoming the first country in the world to do so. The emergency was declared because the local areas wanted to be carbon neutral by 2030.

Therefore, option (c) is the correct answer.

5. Which one of the following viruses is responsible for the recent death of lions in Gir National Park?

CDS Exam (I) 2019

(a) Canine Distemper Virus
(b) Nipah Virus
(c) Hendra Virus
(d) Foot and Mouth Disease Virus

Answer: (a)

Explanation:

- Canine distemper is a contagious and serious disease caused by canine distemper virus that attacks the respiratory, gastrointestinal and nervous systems of both domesticated and wild animals. The disease is though, more common in pet dogs and cats.
- The virus is a member of the genus Morbillivirus of the family Paramyxoviridae (the same family of the viruses that causes measles, mumps and bronchiolitis in humans).
- The Indian Council for Medical Research (ICMR) has confirmed that the Canine Distemper Virus (CDV) was responsible for deaths of lions in the Gir forest of Gujarat and recommended that the remaining lions be vaccinated to prevent further outbreaks.
- A lion does not eat the entire prey at one go. In between, the dogs consume the kill and infect it with the CDV. Once the lion returns to finish it off, it gets the deadly disease.
- The CDV is more dangerous for lions than tigers. This is because lions move together in large numbers, making them more vulnerable to the virus as compared to tigers who are more isolated and are territorial animals.

Therefore, option (a) is the correct answer.

6. Environmental Impact Assessment (EIA) is aimed to help: **Engineering Services (Pre) Exam 2019**

(a) Estimate future needs of the society
(b) Smooth implementation of a project
(c) Cope with rapid increase in population
(d) Resource conservation

Answer: (d)

Explanation:

- The Environmental Impact Assessment (EIA) process is an interdisciplinary and multistep procedure to ensure that environmental considerations are included in decisions regarding projects that may impact the environment.
- The process involves identification, prediction, evaluation, and mitigation of the environmental consequences of implementing a proposed project. The aim of EIA is to shift focus from utilization and exploitation of natural resources to conservation of natural resources.

Therefore, option (d) is the correct answer.

7. India aims to achieve land degradation neutrality by the year **UPPCS (Pre) 2019**

(a) 2025 (b) 2030
(c) 2035 (d) 2040

Answer: (b)

Explanation:

- Land is a vital resource to humankind, like air and water. Land degradation, the deterioration or loss of the productive capacity of the soils for present and future, is a global challenge that affects everyone through food insecurity, higher food prices, climate change, environmental hazards, and the loss of biodiversity and ecosystem services. Land degradation is happening at an alarming pace, contributing to a dramatic decline in the productivity of croplands and rangelands worldwide.
- In order to control land degradation, many initiatives have been taken by the global community such as, Target 15.3 of the Sustainable Development Goals aims to achieve Land Degradation Neutrality (LDN) worldwide by 2030.
- The United Nations Convention to Combat Desertification (UNCCD) adopted land degradation neutrality (LDN) as the principle target of the Convention at COP12 (Conference of Parties), in October, 2015. This project supports 75 countries to establish national voluntary targets for LDN as a means to sustainably increase food security, reduce biodiversity losses, and contribute to climate change adaptation and mitigation.
- India also aims to achieve land degradation neutrality by the year 2030. In the Delhi Declaration (14th edition of the Conference of Parties (COP-14) to the UN Convention to Combat Desertification (UNCCD)), the country parties have agreed to make the Sustainable Development Goal target of achieving land degradation neutrality by 2030, a national target for action.

Therefore, option (b) is the correct answer.

8. Which of the following Sustainable Development Goal (SDG) will target to water availability for all and its permanent management up to 2030 in India?

UPPCS (Pre) 2019

(a) SDG-6 (b) SDG-7
(c) SDG-8 (d) SDG-9

Answer: (a)

Explanation:

- The Sustainable Development Goals (SDGs) are a collection of 17 global goals designed to be a "blueprint to achieve a better and more sustainable future for all". The SDGs, set in 2015 by the United Nations General Assembly and intended to be achieved by the year 2030, are part of a UN Resolution called "The 2030 Agenda".
- The targets and indicators for the SDGs are included in the UN Resolution adopted by the General Assembly in 2017. The 17 Sustainable Development Goals are:
  - **SDG 1:** No Poverty
  - **SDG 2 :** Zero Hunger
  - **SDG 3:** Good Health and Well-being
  - **SDG 4:** Quality Education
  - **SDG 5:** Gender Equality
  - **SDG 6:** Clean Water and Sanitation
  - **SDG 7:** Affordable and Clean Energy
  - **SDG 8:** Decent Work and Economic Growth
  - **SDG 9:** Industry, Innovation, and Infrastructure
  - **SDG 10:** Reducing Inequality
  - **SDG 11:** Sustainable Cities and Communities
  - **SDG 12:** Responsible Consumption and Production
  - **SDG 13:** Climate Action
  - **SDG 14:** Life Below Water
  - **SDG 15:** Life on Land
  - **SDG 16:** Peace, Justice, and Strong Institutions
  - **SDG 17:** Partnerships for the Goal

Therefore, option (a) is the correct answer.

9. Which one of the following diseases is caused by Cadmium pollution? **CAPF (ACs) Exam 2017**

(a) Minamata (b) Itai-itai
(c) Fluorosis (d) Blue baby syndrome

Answer: (b)

Explanation:

- Long-term exposure to Cadmium (Cd) causes Itai-Itai disease which causes severe pain in the joints and spine. It is characterised by osteomalacia with severe bone pain and is associated with renal tubular dysfunction.
- Cadmium exerts toxic effects on the kidneys as well as the skeletal and respiratory systems. It is classified as a human carcinogen and is generally present in the environment at low levels.

Therefore, option (b) is the correct answer.

10. 'Xeriscaping' is a concept related to:

CDS Exam (II) 2017

(a) landscaping related to save water
(b) landscaping related to save soil erosion
(c) weathering of rock surface
(d) all of the above

Answer: (a)

Explanation:

- Xeriscaping is the practice of designing landscapes to reduce or eliminate the need for irrigation. This means xeriscaped landscapes need little or no water beyond what the natural climate provides.

- This practice is quite popular because of its environmental and financial benefits. The most important environmental aspect of xeriscaping is choosing vegetation that is appropriate for the climate. Vegetation that thrives with little added irrigation is called drought-tolerant vegetation. It can reduce water use by 50 or 75%.

Therefore, option (a) is the correct answer.

11. Which one of the following statements about the Global Environment Facility Grant Agreement, signed by India in August 2017 with the World Bank for 'Ecosystems Service Improvement Project' is ***not*** correct?

CDS Exam (II) 2017

(a) The size of the project is about USD 25 million.
(b) The duration of the project is 15 years.
(c) The project will entirely be financed by the World Bank out of its GEF Trust Fund.
(d) The Ministry of Environment, Forest, and Climate Change will implement the project.

Answer: (b)

Explanation:

- The development objective of the Ecosystem Services Improvement Project for India is to improve forest quality, land management and non-timber forest produce (NTFP) benefits for forest dependent communities in selected landscapes in Madhya Pradesh and Chhattisgarh. The proposed Global Environment Facility (GEF) project will be implemented in close coordination with Green India Mission (GIM) on three components:
  - Capacity building (training and technical assistance),
  - Enhancement of forest carbon stocks through forest quality improvement approaches, and
  - Improved livelihoods for forest dependent communities (interventions)
- The objective of the first component is to enhance the capacity and skills of the State Forest Departments, the Forest Development Agencies, and local communities for improving management of forest and land resources and ensuring the delivery of sustainable benefits to local communities that depend on these resources.
- The objective of the second component is to improve the quality and productivity of the existing forests so as to ensure sustained flows of ecosystem services and carbon sequestration, and to ensure the sustainable harvesting and value addition of NTFP to provide economic benefits to forest dependent communities. It also promotes conservation and improve ecological connectivity to be reversal of land degradation on private land holdings and common property resource lands through development of models and capacity for scaling up of sustainable land management practices (interventions).
- Forest and private land holdings and Common Property Resources (CPR) lands for project support and intervention will be identified within a defined landscape planning approach to facilitate ecological connectivity between ecologically important habitats and biologically rich areas. A fourth component will provide project management coordination.
- The project is with the World Bank, with its size being USD 25 million. The implementing agency of the Project is the Ministry of Environment, Forest and Climate Change. The time period of the project is 5 years (2017-22).

Therefore, option (b) is the correct answer.

12. Which of the following items will be relevant to properly conduct the needful Environmental Impact Assessment at a locality for any project coming up there?

Engineering Services (Pre) Exam 2017

1. The lay of the land, particularly large depressions which may hold water of any source.
2. Prevailing or predominant wind directions throughout the year in the locality.
3. Food habits of the local population.
4. Whether sanitary fills for disposal of Municipal wastes are in the neighbourhood.
5. Nearness to National Highways.
6. Availability of higher educational institutions in the vicinity.

Select the correct answer using the codes given below:

(a) 2, 3 and 6 (b) 1, 3 and 5
(c) 1, 2 and 4 (d) 2, 4 and 6

Answer: (c)

Explanation:

- Environmental Impact Assessment (EIA) is a process of evaluating the likely environmental impacts of a proposed project or development, taking into account inter-related socio-economic, cultural and human-health impacts, both beneficial and adverse.
- The following Impacts of projects should be assessed:
  - Change in the land use which can affect drainage pattern, waste disposal, riverbank stability etc. Thus, the lay of the land, particularly large depressions which may hold water of any source is of particular significance. **Hence, 1 is correct.**

- Wind pattern to gauge concentration of emission and its direction to check ambience level, prevailing or predominant wind directions throughout the year in the locality is of particular significance. **Hence, 2 is correct**.
- The sanitary fills for disposal of Municipal wastes in the neighbourhood is assessed in EIA as unhealthy disposal of hazardous waste that can cause serious health and environmental degradation. **Hence, 4 is correct.**

- Food Habits of local population, nearness to National Highways, availability of higher educational institutions in the vicinity cannot be determining factors in Environmental Impact Assessment of any project in the locality. **Hence, 3, 5, and 6 are not correct.**

Therefore, option (c) is the correct answer.

13. The FAO accords the status of 'Globally Important Agricultural Heritage System (GIAHS)' to traditional agricultural systems. What is the overall goal of this initiative? **UPSC CSE (Pre) 2016**

1. To provide modern technology, training in modern farming methods and financial support to local communities of identified GIAHS so as to greatly enhance their agricultural productivity.
2. To identify and safeguard eco-friendly traditional farm practices and their associated landscapes, agricultural biodiversity and knowledge systems of the local communities.
3. To provide Geographical Indication status to all the varieties of agricultural produce in such identified GIAHS.

Select the correct answer using the code given below:

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

Answer: (b)

Explanation:

- Globally Important Agricultural Heritage System (GIAHS) is an initiative of Food and Agriculture Organisation (FAO). Its overall goal is to identify and safeguard Globally Important Agricultural Heritage Systems and their associated landscapes, agricultural biodiversity and knowledge systems through catalysing and establishing a long-term programme to support such systems and enhance global, national and local benefits derived through their dynamic conservation, sustainable management and enhanced viability. **Hence, 2 is correct.**

- **Objective of GIAHS**
  - To leverage global and national recognition of the importance of agricultural heritage systems and institutional support for their safeguard.
  - Capacity building of local farming communities and local and national institutions to conserve and manage GIAHS, generate income and add economic value to goods and services of such systems in a sustainable fashion.
  - To promote enabling regulatory policies and incentive environments to support the conservation, evolutionary adaptation and viability of GIAHS.
  - It does not aim to provide modern technologies and Geographical Indication status to identified GIAHS. **Hence, 1 and 3 are not correct.**

Therefore, option (b) is the correct answer.

14. Consider the following statements:

UPSC CSE (Pre) 2016

1. The Sustainable Development Goals were first proposed in 1972 by a global think tank called the 'Club of Rome'.
2. The Sustainable Development Goals have to be achieved by 2030.

Which of the statements given above is/are correct?

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

Answer: (b)

Explanation:

- The 17 Sustainable Development Goals (SDGs), also known as the Global Goals, are a universal call for action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity.
- They are built upon the successes of the Millennium Development Goals, including new areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities.
- The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.
- Adopted in 2015, SDGs came into effect in January, 2016. They are meant to be achieved by 2030. **Hence, statement 2 is correct.**
- The SDGs were born at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The Club of Rome advocated resource conservation for the first time in a more systematic way in 1968. **Hence, statement 1 is not correct.**

Therefore, option (b) is the correct answer.

7 Environmental Organizations

1. If a particular plant species is placed under Schedule VI of the Wildlife Protection Act, 1972, what is the implication? **UPSC CSE (Pre) 2020**

(a) A license is required to cultivate that plant.

(b) Such a plant cannot be cultivated under any circumstances.

(c) It is a Genetically Modified crop plant.

(d) Such a plant is invasive and harmful to the ecosystem.

Answer: (a)

Explanation:

- The Wild Life Protection Act, 1972 is enacted for protection of plants and animal species. The Act provides for the protection of wild animals, birds and plants. It has six schedules which give varying degrees of protection.
  - Schedule I and part II of Schedule II provide absolute protection; offences under these are prescribed with the highest penalties.
  - Species listed in Schedule III and Schedule IV are also protected, but the penalties are much lower.
  - Schedule V includes the animals which may be hunted.
  - The specified endemic plants in Schedule VI are prohibited from cultivation and planting.
- In Schedule VI, following plants are included:
  - Beddomes' cycad *(Cycas beddomei)*,
  - Blue Vanda *(Vanda soerulec)*,
  - Kuth *(Saussurea lappa)*,
  - Ladies slipper orchids *(Paphiopedilum spicerianum)*,
  - Pitcher plant *(Nepenthes khasiana)*,
  - Red Vanda *(Rananthera imschootiana)*
- However, the further also states that cultivation of specified plants without license is prohibited. As per Section 17C of the Act, no person shall cultivate a specified plant except under and in accordance with a license granted by the Chief Wild Life Warden or any other officer authorized by the State Government in this behalf.

Therefore, option (a) is the correct answer.

2. Consider the following pairs: **UPSC CSE (Pre) 2020**

International agreement/set-up		**Subject**
1. Alma-Ata Declaration	:	Healthcare of the people
2. Hague Convention	:	Biological and chemical weapons
3. Talanoa Dialogue	:	Global climate change
4. Under2 Coalition	:	Child rights

Which of the pair(s) given above is/are correctly matched?

(a) 1 and 2 only (b) 4 only

(c) 1 and 3 only (d) 2, 3 and 4 only

Answer: (c)

Explanation:

- **Alma-Ata Declaration:** It was adopted at the International Conference on Primary Health Care (PHC) which was held in Almaty, Kazakhstan in 1978. It urged all the governments, health care workers and development workers to promote and protect the primary health of all the people. **Hence, pair 1 is correctly matched**.
- **Hague Convention:** There are a series of Hague Convention on different subjects such as Convention for the Protection of Cultural Property in the Event of Armed Conflict, Hague Convention on the Civil Aspects of International Child Abduction, etc. But it is not related to biological and chemical weapons. **Hence, pair 2 is not correctly matched.**
- **Talanoa Dialogue:** The Dialogue was launched at the UN Climate Change Conference (COP 23) in Bonn (Germany) in 2017. Talanoa is a traditional word used in Fiji and across the Pacific to reflect a process of inclusive, participatory and transparent dialogue.The purpose of Talanoa is to share stories, build empathy and to make wise decisions for the collective good. **Hence, pair 3 is correctly matched.**
- **Under2 Coalition:** The Under2 Coalition is a global community of state and regional governments committed to ambitious climate action in line with the Paris Agreement. The coalition brings together more than 220

subnational governments who represent over 1.3 billion people and 43% of the global economy. Currently, Telangana and Chhattisgarh are signatories to this pact from India. Signatories commit to keeping global temperature rises to well below 2°C with efforts to reach 1.5°C. **Hence, pair 4 is not correctly matched.**

Therefore, option (c) is the correct answer.

3. Arrange the following events in chronological order of their commencement: **UPPCS (Pre) 2020**

I. Project Tiger
II. Project Elephant
III. Wildlife Protect Act
IV. Biological Diversity Act

Select the correct answer using the codes given below.

Codes:

(a) I, II, III, IV (b) II, I, IV, III
(c) III, I, II, IV (d) III, IV, I, II

Answer: (c)

Explanation:

- The Wildlife Protection Act, 1972 is an act to provide for the protection of wild animals, birds and plants and ensuring the ecological and environmental security of the country.
- Project Tiger is an ongoing Centrally Sponsored Scheme and was launched in 1973, with the aim to promote conservation of the tiger.
  - Project Tiger has been the largest species conservation initiative of its kind in the world. While the field implementation of the project, protection and management in the designated reserves is done by the project States, which also provide the matching grant to recurring items of expenditure, deploy field staff/officers, and give their salaries, the Project Tiger Directorate of the Ministry of Environment and Forests was mandated with the task of providing technical guidance and funding support.
  - The Ministry of Environment, Forests and Climate Change is providing central assistance to the tiger States for tiger conservation in designated tiger reserves.
- Project Elephant is a centrally sponsored scheme and was launched in February 1992 for the protection of elephants, their habitats and corridors.
  - The Ministry of Environment, Forest and Climate Change provides the financial and technical support to major elephant range states in the country through the project.
  - Project Elephant has been formally implementing MIKE (Monitoring of Illegal Killing of Elephants) programme of CITES in 10 Elephant Reserves since January 2004. It is mandated by the Conference of Parties resolution of CITES.
- 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, which recognizes the sovereign rights of states to use their own Biological Resources.
  - The Biological Diversity Act, 2002 covers conservation, use of biological resources and associated knowledge occurring in India for commercial or research purposes or for the purposes of bio-survey and bio-utilisation.

Therefore, option (c) is the correct answer.

4. National Clean Air Programme has been launched by the Central Government in which year? **UPPCS (Pre) 2020**

(a) 2018 (b) 2017
(c) 2020 (d) 2019

Answer: (d)

Explanation:

- Ministry of Environment, Forest and Climate Change (MoEFCC) in January 2019, launched National Clean Air Programme (NCAP) as a long-term, time-bound, national level strategy to tackle the air pollution problem across the country in a comprehensive manner with targets to achieve 20% to 30% reduction in Particulate Matter concentrations by 2024 keeping 2017 as the base year for the comparison of concentration.
- Under NCAP, 122 non-attainment cities have been identified across the country based on the Air Quality data from 2014-2018.
  - Non-attainment cities are those that have fallen short of the National Ambient Air Quality Standards (NAAQS) for over five years.

Therefore, option (d) is the correct answer.

5. Arrange the following events in chronological order and select the correct answer from the codes given below: **UPPCS (Pre) 2020**

I. Rio Earth Summit
II. Publication of Brundtland Commission Report
III. Enforcement of Montreal Protocol
IV. Publication of 'The Limit to Growth' Report

Codes:

(a) I, IV, III, II (b) IV, II, III, I
(c) IV, III, II, I (d) IV, I, III, II

Answer: (b)

Explanation:

- **'The Limit to Growth' Report**
  - In 1968, a group of about seventy five persons belonging to different strata of society from around the world founded the Club of Rome. It believed that the possibilities of continuous growth have been exhausted and timely action is essential in order to avert a planetary collapse. It chose its initial theme "The Predicament of Mankind" in June 1970. It commissioned the research by four MIT (Massachusetts Institute of Technology) scientists led by Donald Meadows, which was published by the Club of Rome as 'The Limits to Growth' in 1972.
  - The second report entitled Beyond Limits was published in 1992, which gave fresh evidences as to how mankind has crossed beyond the limits.
- **Brundtland Commission Report**
  - In 1987, the World Commission on Environment and Development (WCED), which had been set up in 1983, published a report entitled "Our common future".
  - The document came to be known as the "Brundtland Report" after the Commission's chairwoman, Gro Harlem Brundtland.
- **Montreal Protocol**
  - In 1987, the Montreal Protocol on Substances that Deplete the Ozone Layer (the Montreal Protocol), an international agreement was made. It was designed to stop the production and import of ozone depleting substances and reduce their concentration in the atmosphere to help protect the earth's ozone layer.
  - Even though the landmark agreement was signed in 1987, it entered into force in 1989. The parties to the Protocol meet once a year to make decisions aimed at ensuring the successful implementation of the agreement.
- **Rio Earth Summit**
  - In 1992, the United Nations Conference on Environment and Development (UNCED), also known as the 'Earth Summit', was held in Rio de Janeiro, Brazil, from 3-14 June 1992.
  - This global conference, held on the occasion of the 20th anniversary of the first Human Environment Conference in Stockholm, Sweden, in 1972, brought together political leaders, diplomats, scientists, representatives of the media and non-governmental organizations (NGOs) from 179 countries for a massive effort to focus on the impact of human socio-economic activities on the environment.

Therefore, option (b) is the correct answer.

6. Consider the following statements:

UPSC CSE (Pre) 2019

1. Under Ramsar Convention, it is mandatory on the part of the Government of India to protect and conserve all the wetlands in the territory of India.
2. The Wetlands (Conservation and Management) Rules, 2010 were framed by the Government of India based on the recommendations of Ramsar Convention.
3. The Wetlands (Conservation and Management) Rules,2010 also encompass the drainage area or catchment regions of the wetlands as determined by the authority.

Which of the statements given above is/are correct?

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

Answer: (c)

Explanation:

- Ramsar Convention designates suitable wetlands for the list of Wetlands of International Importance (the "Ramsar List") and ensures their effective management. The Ramsar convention is not a legal binding treaty. Under the "three pillars" of the Convention, the Contracting Parties commit to:
  - work towards the wise use of all their wetlands;
  - designate suitable wetlands for the Ramsar List and ensure their effective management;
  - cooperate internationally on transboundary wetlands, shared wetland systems and shared species.
- Therefore, under Ramsar Convention, it is not mandatory on the part of the contracting parties to protect and conserve all the wetlands in their territory**. Hence, statement 1 is not correct.**
- The Wetlands (Management and Conservation) Rules, 2010 were framed under the Environment (Protection) Act, 1986.
- As per Clause 3 of the Rules, these rules shall apply to wetlands notified by the State government, Central government, Union Territory administration and those classified as Wetlands of International Importance under the Ramsar convention. Here, Ramsar sites are only a part of Indian efforts towards conservation of wetlands in India. **Hence, statement 2 is not correct**.
- Under the Wetlands (Conservation and Management Rules), 2010, 'Wetland' means an area of marsh, peatland or water, 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 tide does not exceed six meters

and includes all inland waters such as lakes, reservoir, tanks, backwaters, lagoon, creeks, estuaries and man-made wetland and the zone of direct influence on wetlands that is to say the drainage area or catchment region of the wetlands as determined by the authority, but does not include main river channels, paddy fields and the coastal wetland covered under the Government of India notification. **Hence, statement 3 is correct**.

Therefore, option (c) is the correct answer.

7. Which one of the following is the main objective of Vienna Convention and Montreal Protocol?

CAPF (ACs) Exam 2019

(a) Combat desertification
(b) Formulate sustainable developmental goals
(c) Protection of ozone layer
(d) Combat climate change

Answer: (c)

Explanation:

- The Vienna Convention, adopted in 1985, and Montreal Protocol, adopted in 1987 is a multilateral environmental agreement for the protection of the ozone layer.
- The objective is to protect the environment from the harmful effects of the depletion of ozone layer through worldwide control and reduction of usage and production of ozone depleting substances (ODSs).
- ODSs include chlorofluorocarbons (CFCs), bromine containing halons and methyl bromide, hydrochloro fluoro carbons (HCFCs), carbon tetrachloride (CCl_4), and methyl chloroform.
- The Montreal Protocol's control of ODSs stimulated the development of replacement substances, firstly hydrochlorofluorocarbons (HCFCs) and then hydrofluorocarbons (HFCs), in a number of industrial sectors. While HFCs have only a minor effect on stratospheric ozone, some HFCs are powerful greenhouse gases (GHGs).

Therefore, option (c) is the correct answer.

8. Which one of the following statements about the National Green Tribunal (NGT) is ***not*** correct?

CDS Exam (I) 2019

(a) It was set up in the year 2010.
(b) It is involved in effective and expeditious disposal of cases relating to environmental protection and conservation of forests.
(c) It may consider giving relief and compensation for damages to persons and property.
(d) It is bound by the procedures laid down under the Code of Civil Procedure, 1908.

Answer: (d)

Explanation:

- The NGT was established in 2010 under the National Green Tribunal Act, 2010 for effective and expeditious disposal of cases relating to environmental protection and conservation of forests and other natural resources. New Delhi is the Principal place of sitting of NGT, others are Bhopal, Pune, Kolkata and Chennai.
- The Tribunal has jurisdiction over all civil cases involving substantial question relating to environment (including enforcement of any legal right relating to environment). However, the Tribunal is not bound by the procedure laid down under the Code of Civil Procedure 1908, but is guided by principles of 'natural justice'.
- NGT by an order, can provide:
  - relief and compensation to the victims of pollution and other environmental damage (including accident occurring while handling any hazardous substance),
  - for restitution of property damaged, and
  - for restitution of the environment for such area or areas, as the Tribunal may think fit.

Therefore, option (d) is the correct answer.

9. The 'Global 500' award is given for rare achievement in which of the following field? **UPPCS (Pre) 2019**

(a) Gene preservation
(b) Environmental conservation
(c) Population control
(d) Pollution control

Answer: (b)

Explanation:

- The Global 500 Roll of Honour award was launched in 1987 by the United Nation Environment Programme (UNEP) to recognize and honour environment achievement.
- It honours individual and organizations that combat environment issues despite immense social, political and logistical obstacles. The award recognized individuals of all ages and organisations and government of any size.

Therefore, option (b) is the correct answer.

10. Which of the following is the Nodal Institution for implementation of Sustainable Development Goals in India? **UPPCS (Pre) 2019**

(a) Planning Commission
(b) Disinvestment Commission
(c) NITI Aayog
(d) Finance Commission

Answer: (c)

Explanation:

- In 2015, the United Nations General Assembly adopted the 2030 Agenda for Sustainable Development. 193 member countries, including India, got committed to the 17 Sustainable Development Goals that require efforts to end all forms of poverty, fight inequalities and tackle climate change while ensuring that no one was left behind.
- After the SDGs were adopted, the National Institution for Transforming India (NITI Aayog), the premier policy think tank of the Government of India, was assigned the responsibility of overseeing their implementation as a part of its oversight responsibility.

Therefore, option (c) is the correct answer.

11. The 'Global-500' Award is given for rare achievement in which of the following fields? **UPPCS (Pre) 2019**

(a) Gene preservation
(b) Environment conservation
(c) Population control
(d) Pollution control

Answer: (b)

Explanation:

- The United Nations Environment Programme (UNEP) launched the Global 500 Awards/ Roll of Honour in 1987 to recognize the environmental achievements of individuals and organizations around the world.
- The award is a tribute to success on the front lines of environmental action. It honors individuals and organizations that combat environmental issues despite immense social, political and logistical obstacles.

Therefore, option (b) is the correct answer.

12. Arrange the following events in chronological order of their commencement and select correct answer from the codes given below: **UPPCS (Pre) 2019**

I. Wild Life (Protection) Act
II. Biological Diversity Act
III. Project Tiger
IV. Project Elephant

Codes:

(a) I, II, III, IV (b) I, III, IV, II
(c) II, III, IV, I (d) II, III, I, IV

Answer: (b)

Explanation:

- The Wildlife Protection Act, 1972 is an act to provide for the protection of wild animals, birds and plants and ensuring the ecological and environmental security of the country.
- Project Tiger is an ongoing Centrally Sponsored Scheme and was launched in 1973, with the aim to promote conservation of the tiger.
  - Project Tiger has been the largest species conservation initiative of its kind in the world. While the field implementation of the project, protection and management in the designated reserves is done by the project States, which also provide the matching grant to recurring items of expenditure, deploy field staff/officers, and give their salaries, the Project Tiger Directorate of the Ministry of Environment and Forests was mandated with the task of providing technical guidance and funding support.
  - The Ministry of Environment, Forests and Climate Change is providing central assistance to the tiger States for tiger conservation in designated tiger reserves.
- Project Elephant is a centrally sponsored scheme and was launched in February 1992 for the protection of elephants, their habitats and corridors.
  - The Ministry of Environment, Forest and Climate Change provides the financial and technical support to major elephant range states in the country through the project.
  - Project Elephant has been formally implementing MIKE (Monitoring of Illegal Killing of Elephants) programme of CITES in 10 Elephant Reserves since January 2004. It is mandated by the Conference of Parties resolution of CITES.
- 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, which recognizes the sovereign rights of states to use their own Biological Resources.
  - The Biological Diversity Act, 2002 covers conservation, use of biological resources and associated knowledge occurring in India for commercial or research purposes or for the purposes of bio-survey and bio-utilisation.

Therefore, option (b) is the correct answer.

13. Which of the following is ***not*** correctly matched? **UPPCS (Pre) 2019**

(a) Cartagena Protocol – Biosafety
(b) Stockholm Convention – Persistent organic pollutant
(c) Montreal Protocol – Ozone layer
(d) Kyoto Protocol – Save water

Answer: (d)

8 Miscellaneous

1. With reference to Indian elephants, consider the following statements: **UPSC CSE (Pre) 2020**

1. The leader of an elephant group is a female.
2. The maximum gestation period can be 22 months.
3. An elephant can normally go on calving till the age of 40 years only.
4. Among the States in India, the highest elephant population is in Kerala.

Which of the statements given above is/are correct?

(a) 1 and 2 only (b) 2 and 4 only
(c) 3 only (d) 1, 3 and 4 only

Answer: (a)

Explanation:

- The elephant herd is led by the oldest and largest female member (known as the matriarch). This herd includes the daughters of the matriarch and their offspring. **Hence,statement 1 is correct.**
- Elephants have the longest-known gestational (pregnancy) period of all mammals, lasting upto 680 days (22months). **Hence, statement 2 is correct.**
- Females between 14-45 years may give birth to calves approximately every four years with the mean interbirth intervals increasing to five years by age 52 and six years by age 60. **Hence, statement 3 is not correct.**
- As per Elephant Census (2017), Karnataka has the highest number of elephants (6,049), followed by Assam (5,719) and Kerala (3,054). **Hence, statement 4 is not correct.**

Therefore, option (a) is the correct answer.

2. What is the use of biochar infarming?

UPSC CSE (Pre) 2020

1. Biochar can be used as a part of the growing medium in vertical farming.
2. When biochar is a part of the growing medium, it promotes the growth of nitrogen-fixing microorganisms.
3. When biochar is a part of the growing medium, it enables the growing medium to retain water for longer time.

Which of the statements given above is/are correct?

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

Answer: (d)

Explanation:

- Biochar is a porous carbonaceous solid produced by heating various biomass feedstocks under high temperatures in an oxygen-limited environment.
- As biochar migrates vertically through the soil profile, therefore can be used as a part of the growing medium in vertical farming. **Hence, statement 1 is correct**.
- Due to its adsorption ability, some biochars have the potential to immobilize heavy metals, pesticides, herbicides, and hormones; prevent nitrate leaching and faecal bacteria into waterways; and reduce N_2O and CH_4 emissions from soils. **Hence, statement 2 is correct**.
- Biochar can help retain water and nutrients in the soil for the plants to take up as they grow. **Hence, statement 3 is correct.**

Therefore, option (d) is the correct answer.

3. Which of the following are the most likely places to find the musk deer in its natural habitat?

UPSC CSE (Pre) 2020

1. Askot Wildlife Sanctuary
2. Gangotri National Park
3. Kishanpur Wildlife Sanctuary
4. Manas National Park

Select the correct answer using the code given below:

(a) 1 and 2 only (b) 2 and 3 only
(c) 3 and 4 only (d) 1 and 4 only

Answer: (a)

Explanation:

- Musk deer lives mainly in forested and alpine scrub habitats in the mountains of southern Asia, notably the Himalayas.

- **Askot Wildlife Sanctuary**
  - It is located 54 km from Pithoragarh, near Askot in Uttarakhand state ofIndia.
  - This sanctuary has been set up primarily with the object of conserving the musk deer and its habitat. **Hence, 1 is correct.**
- **Gangotri National Park**
  - Established in 1989, it is located in the upper catchment of Bhagirathi River inUttarakhand.
  - The park is home to blue sheep, Himalayan Tahr, musk deer, snow leopard,etc. **Hence, 2 is correct**.
- **Kishanpur Wildlife Sanctuary**
  - It is a part of the Dudhwa Tiger Reserve near Mailani in Uttar Pradesh. It was founded in 1972.
  - A huge number of resident and migratory birds like falcons, drongos, owls, egrets, and peacocks can be spotted in the open meadows, which is traversed by perennial streams. **Hence, 3 is not correct.**
- **Manas National Park**
  - Manas National Park is located in the Himalayan foothills in Assam. It is contiguous with the Royal Manas National Park in Bhutan.
  - It is known for its rare and endangered endemic wildlife such as the Assam roofed turtle, hispid hare, golden langur and pygmyhog.
  - Manas is famous for its population of the wild water buffalo. **Hence, 4 is not correct.**

Therefore, option (a) is the correct answer.

4. Consider the following statements:

The Environment Protection Act, 1986 empowers the Government of India to **UPSC CSE (Pre) 2019**

1. state the requirement of public participation in the process of environmental protection, and the procedure and manner in which it is sought
2. lay down the standards for emission or discharge of environmental pollutants from various sources

Which of the statements given above is/are correct?

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

Answer: (b)

Explanation:

- Environmental Impact Assessment (EIA) Notification, 2006 was issued under relevant provisions of the Environment (Protection) Act, 1986. The EIA provides for screening, scoping, public consultation and appraisal of project proposals. One of the most significant determinants of EIA is the procedure of Public Hearing and Public Participation on any developmental project.
- However, the Environment (Protection) Act (EPA), 1986, nowhere mentions public participation for environmental protection. It is only concerned with government authorities and polluters to protect the environment. **Hence, statement 1 is not correct**.
- The EPA, 1986 empowers the Central Government to take all appropriate measures to prevent and control pollution and to establish effective machinery for the purpose of protecting and improving the quality of environment and preventing, abating and controlling environmental pollution.
- Section 3 of the EPA, 1986, empowers the Central Government to lay down standards for emission or discharge of environmental pollutants from various sources having regard to the quality or composition of the emission or discharge of environmental pollutants from such sources. **Hence, statement 2 is correct**.

Therefore, option (b) is the correct answer.

5. As per the Solid Waste Management Rules, 2016 in India, which one of the following statements is correct?

UPSC CSE (Pre) 2019

(a) Waste generator has to segregate waste into five categories.
(b) The Rules are applicable to notified urban local bodies, notified towns and all industrial townships only.
(c) The Rules provide for exact and elaborate criteria for the identification of sites for landfills and waste processing facilities.
(d) It is mandatory on the part of waste generator that the waste generated in one district cannot be moved to another district.

Answer: (c)

Explanation:

- Solid Waste Management Rules, 2016 replaced the Municipal Solid Wastes (Management and Handling) Rules, 2000.
- The Rules are applicable beyond Municipal areas and extend to urban agglomerations, census towns, notified industrial townships, areas under the control of Indian Railways, airports, airbase, port and harbour, defence establishments, special economic zones, State and Central Government organizations, places of pilgrims, religious and historical importance.
- The responsibility of generators has been introduced to segregate waste into three categories – Wet, Dry and Hazardous Waste. The generator will have to pay 'User Fee' to waste collector and for 'Spot Fine' for littering and non-segregation.

- Waste processing facilities will have to be set up by all local bodies. Further the landfill site shall be 100 metres away from a river, 200 metres from a pond and 20 km away from airports/airbase. Hence,the rules provide for exact and elaborate criteria for identification of landfill sites and waste processing facilities.
- The bio-degradable waste should be processed, treated and disposed of through composting or bio- methanation within the premises as far as possible. The residual waste shall be givento its waste collectors or agency as directed by the local authority.
- There is no such provision that makes it mandatory on the part of waste generator that the waste generated in one district cannot be moved to another district.

Therefore, option (c) is the correct answer.

6. Consider the following statements:

UPSC CSE (Pre) 2019

1. As per law, the Compensatory Afforestation Fund Management and Planning Authority exists at both National and State levels.
2. People's participation is mandatory in the compensatory afforestation programmes carried out under the Compensatory Afforestation Fund Act, 2016.

Which of the statements given above is/are correct?

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

Answer: (a)

Explanation:

- The Supreme Court in 2009 issued orders that there will be a Compensatory Afforestation Fund Management and Planning Authority (CAMPA) as National Advisory Council under the chairmanship of the Union Minister of Environment for monitoring, technical assistance and evaluation of compensatory afforestation activities.
- Compensatory afforestation means afforestation done in lieu of diversion of forest land for non-forest use. For this purpose, funds are collected from the company to whom the forest land is diverted.
- The Compensatory Afforestation Fund Act, 2016, establishes the National Compensatory Afforestation Fund under the Public Account of India, and a State Compensatory Afforestation Fund under the Public Account of each State which are to be managed by the National and State Compensatory Afforestation Fund Management and Planning Authorities, respectively. **Hence, statement 1 is correct**.
- However, there is no mention in the Act of mandatory people's participation in carrying out programmes under the Act. **Hence, statement 2 is not correct.**

Therefore, option (a) is the correct answer.

7. In India, 'extend producer responsibility' was introduced as an important feature in which of the following?

UPSC CSE (Pre) 2019

(a) The Bio-medical Waste (Management and Handling) Rules,1998
(b) The Recycled Plastic (Manufacturing and Usage) Rules, 1999
(c) The e-Waste (Management and Handling) Rules, 2011
(d) The Food Safety and Standard Regulations, 2011

Answer: (c)

Explanation:

- Extended Producer's Responsibility (EPR) is the main feature of the E-Waste (Management and Handling) Rules, 2011, wherein the producer of electrical and electronic equipment has the responsibility of managing such equipment after its 'end of life', thus the producer is responsible for their products once the consumer discards them.
- Under this, producer is also entrusted with the responsibility to finance and organize a system to meet the costs involved in complying with EPR.
- The E-Waste (Management and Handling) Rules, 2011 were notified with the primary objective to channelize the e-waste generated in the country for environmentally sound recycling, which is largely controlled by the un-organized sector, which adopts crude practices resulting into higher pollution and less recovery, thereby causing wastages of precious resources and damage to the environment.

Therefore, option (c) is the correct answer.

8. 'The Sasakawa Award' of United Nations is given in recognition of the work done in the field of

CDS Exam (II) 2019

(a) Disaster Reduction (b) Peace Keeping
(c) Health Services (d) Poverty Alleviation

Answer: (a)

Explanation:

- The United Nations Sasakawa Award is the most prestigious international award in the area of Disaster Risk Management. It was instituted in 1986 and is jointly organized by the United Nations Office for Disaster Risk Reduction (UNDRR) and the Nippon Foundation.
- A total grant of USD 50,000 is distributed among the winners which can be either organizations or individuals that have taken active efforts in reducing disaster risk in their communities or advocates for disaster risk reduction.

Therefore, option (a) is the correct answer.

9. Where are the largest quantity of cichlids found in India? **CDS Exam (II) 2019**

(a) Backwaters of Kerala (b) Sunderbans
(c) Nannada (d) Godavari

Answer: (a)

Explanation:

- Cichlids are primarily brackish and freshwater fishes. In India, they are found primarily in the Western Ghats and the North-East. There are more than 1600 varieties of cichlids fish in the world, but India is native to only three in them. *Etroplus Suratensis, Etroplus Maculates* and *Pseudetroplus Maculates*.
- They are largely aqua-cultured as the popular food fish of Kerala. Also, as their size is not too big, they are the most suitable choice for home-aquariums.

Therefore, option (a) is the correct answer.

10. The Silent Valley is located in which one of the following States: **CISF AC (EXE) LDCE 2019**

(a) Himachal Pradesh (b) Jammu and Kashmir
(c) Jharkhand (d) Kerala

Answer: (d)

Explanation:

- The Silent Valley is a national park situated in Kerala.
- The forest of the Silent Valley area was notified as Reserved Forest in 1914.
- Lion tailed macaques is the flagship species of this park.
- The indigenous tribal groups that live within its boundaries include Irulas, Kurumbas, Mudugas and Kattunaikkars.

Therefore, option (d) is the correct answer.

11. Which of the following is an example of herbicide? **UPPCS (Pre) 2019**

(a) Sodium chlorate
(b) Potassium permanganate
(c) Bleaching powder
(d) None of the above

Answer: (a)

Explanation:

- A herbicide is a pesticide used to kill unwanted plants. Selective herbicides kill certain targets while leaving the desired crop relatively unharmed. Some of these act by interfering with the growth of the weed and are often based on plant hormones.
- Herbicides used to clear waste ground are nonselective and kill all plant material with which they come into contact.
- Sodium chlorate ($NaClO_3$) is a widely used non-selective herbicide. It belongs to the class of inorganic herbicides (containing no carbon), and was developed before the modern era of organic herbicides.
- Sodium chlorate is a white, odorless, crystalline solid that looks like common table salt (sodium chloride) and is water soluble. It is a strong oxidant, not combustible but reacts violently with combustible and reducing materials. There is a risk of fire and explosion in dry mixtures with other substances, especially organic materials, i.e., other herbicides, sulphur, peat, powdered metals, strong acids, etc.

Therefore, option (a) is the correct answer.

12. The first Union Territory of India to run 100% on solar energy is **UPPCS (Pre) 2019**

(a) Andaman and Nicobar (b) Chandigarh
(c) Diu (d) Puducherry

Answer: (c)

Explanation:

- Solar energy is the radiation that is received from the sun and utilized in the form of electricity and thermal energy by using various available technologies like photovoltaic panels, solar heater, etc. India lying in tropical belt has an advantage of receiving peak solar radiation for 300 days, amounting 2300-3,000 hours of sunshine equivalent to above 5,000 trillion kWh.
- Diu has become the nation's first ever renewable energy surplus Union Territory (UT). Diu runs 100% on solar power energy. Becoming fully solar energy efficient has helped the UT in cutting down on the power loss which it earlier faced when it used to borrow electricity from a Gujarat government grid.

Therefore, option (c) is the correct answer.

13. With reference to the circumstances in Indian agriculture, the concept of "Conservation Agriculture" assumes significance. Which of the following fall under the Conservation Agriculture? **UPSC CSE (Pre) 2018**

1. Avoiding the monoculture practices
2. Adopting minimum tillage
3. Avoiding the cultivation of plantation crops
4. Using crop residues to cover soil surface
5. Adopting spatial and temporal crop sequencing/crop rotations

Select the correct answer using the code given below:

(a) 1, 3 and 4 (b) 2, 3, 4 and 5
(c) 2, 4 and 5 (d) 2, 3 and 5

Answer: (c)

Explanation:

- Conservation Agriculture is a farming system that promotes the maintenance of a permanent soil cover, minimum soil disturbance (i.e., no tillage) and diversity of plant species.
- It enhances biodiversity and natural biological processes above and below the ground surface, which contribute to increased water and nutrient use efficiency and improved and sustained crop production.
- According to Food and Agriculture Organisation (FAO), three principles of Conservation Agriculture are:
  - Minimizing mechanical soil disturbance (i.e., no tillage or minimum tillage) through direct seed and/or fertilizer placement. **Hence, 2 is correct.**
  - Permanent soil organic cover (at least 30%) with crop residues and/or cover crops. **Hence, 4 is correct.**
  - Species diversification through varied crop sequences and associations involving at least three different crops. **Hence, 5 is correct.**
- Monoculture is the agricultural practice of growing a single crop, plant, or livestock species, variety, or breed in a field or farming system at a time. Growing the same crops year after year on the same land increases vulnerability to pest and disease attacks. Avoiding the monoculture practices do not fall under the Conservation Agriculture. **Hence, 1 is not correct.**
- Plantation crops are tea, coffee, rubber etc. Avoiding the cultivation of these crops is not a significant example for the Conservation Agriculture because tea and coffee are most demanding beverages and rubber is an important industrial raw material. **Hence, 3 is not correct.**

Therefore, option (c) is the correct answer.

14. Which of the following is the main component of natural gas? **UPPCS (Pre) 2018**

(a) Ethane (b) Butane
(c) Carbon monoxide (d) Methane

Answer: (d)

Explanation:

Natural gas is a fossil energy source that is formed deep beneath the earth's surface. It contains many compounds, methane being the largest component of natural gas along with natural gas liquids, non-hydrocarbon gases (carbon dioxide and water vapor), etc.

Therefore, option (d) is the correct answer.

15. Which of the following energy sources produces ***no*** atmospheric pollution? **UPPCS (Pre) 2018**

(a) Nuclear energy (b) Solar energy
(c) Petroleum energy (d) Coal energy

Answer: (b)

Explanation:

All the sources mentioned produce atmospheric pollution except solar energy. Solar energy is the renewable energy which produces zero atmospheric pollution.

Therefore, option (b) is the correct answer.

16. Due to some reasons, if there is a huge fall in the population of species of butterflies, what could be its likely consequence/consequences? **UPSC CSE (Pre) 2017**

1. Pollination of some plants could be adversely affected.
2. There could be a drastic increase in the fungal infections of some cultivated plants.
3. It could lead to a fall in the population of some species of wasps, spiders and birds.

Select the correct answer using the code given below:

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

Answer: (c)

Explanation:

- Butterflies are one of the most important species of the ecosystem as they help in the pollination of many agricultural crops. **Hence, 1 is correct.**
- In addition to their ecological niche, butterflies are also a food source for predators like birds, spiders, lizards and other animals and a huge shortfall in its population will disturb the stability of the food web. **Hence, 3 is correct.**
- In the absence of the butterflies or due to a huge fall in the population of butterflies, drastic decrease in the fungal infection of plants would occur as the disease transmitter would not be there to transmit the disease. **Hence, 2 is not correct.**

Therefore, option (c) is the correct answer.

17. What are the main constituents of biogas? **CDS Exam (II) 2017**

(a) Methane and sulphur dioxide
(b) Methane and carbon dioxide
(c) Methane, hydrogen and nitric oxide
(d) Methane and nitric oxide

Answer: (b)

Explanation:

- Biogas is a naturally occurring gas that is generated by the breakdown of organic matter by anaerobic bacteria and is used in energy production. It differs from natural gas in that it is a renewable energy source produced biologically through anaerobic digestion rather than a fossil fuel produced by geological processes.

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