IASbaba Daily Prelims Test 2015- [Day 6]

Environment and Ecology

Questions and Answers

1. Consider the following statements

1. Sun is the only source of energy for all ecosystems on Earth
2. Of the incident solar radiation more than 50 per cent of it is **Photosynthetically Active Radiation (PAR)**

Select the correct code

1. Only 1
2. Only 2
3. Both
4. None

Solution: 4

Explanation: Except for the deep sea hydro-thermal ecosystem, sun is the only source of energy for all ecosystems on Earth. Of the incident solar radiation less than 50 per cent of it is **photosynthetically active radiation** (PAR).

2. Arrange the following in increasing order of 'Productivity in Ecosystem' (metric tonne per year)

1. Woodland and shrubland < tropical rain forest < Continental shelf < Open sea
2. Continental shelf < Woodland and shrubland < Tropical rain forest < Open ocean
3. Tropical rain forest< Continental shelf< Woodland and shrubland < Open ocean
4. Woodland and shrubland < Continental shelf < Tropical rain forest < Open ocean

Select the correct codes

1. 1
2. 2
3. 3
4. 4

Solution: 4

In ecology, **productivity** or **production** refers to the rate of generation of biomass in an ecosystem. It is usually expressed in units of mass per unit surface (or volume) per unit time, for instance grams per square metre per day (g m^{-2} d^{-1}). The mass unit may relate to dry matter or to the mass of carbon generated. Productivity of autotrophs such as plants is called **primary productivity**, while that of heterotrophs such as animals is called **secondary productivity**.

Look into these links for the reference of Productivity chart. It is important

http://loki.stockton.edu/~cromartj/ecology/ecolectures/26produc.htm

http://www.globalchange.umich.edu/globalchange1/current/lectures/kling/energyflow/energyflow.html

3. Consider the following statements about ecological pyramids

1. Grassland and forest ecosystem have similar Pyramid of Numbers.
2. Pyramid of Biomass is the most accurate among three ecological pyramids-Number, Biomass and Energy.
3. Pyramid of Energy is always upright in nature irrespective of type of ecosystem.

Select the correct code

1. 1 and 2
2. 1, 2 and 3
3. Only 2
4. Only 3

Solution: 4

Explanation:

There are three ways an ecological pyramid can be represented. A **Pyramid of Numbers** can be generated by counting all the organisms at the different feeding levels. As you might guess, this can be a very difficult task since we are not just identifying each species in the ecosystem. We are also counting how many of each species is present. On occasion, this approach will not work. For example, one tree (a producer) can represent an ecosystem and harbor numerous populations of herbivores and carnivores. Thus, the bottom of the pyramid would be very small and not flared out.
A second type of pyramid is called a **Pyramid of Biomass** where organisms are collected from each feeding level, dried and then weighed. This dry weight (biomass) represents the amount of organic matter (available energy) of the organisms. [Note that there are alternate, nonlethal ways to determine biomass.] While this approach will generally create a pyramid that illustrates energy flow, its use can also produce an inverted pyramid. For example, in aquatic ecosystems, phytoplankton could reproduce and then be eaten rapidly by zooplankton. Therefore, it would be possible to have few herbivores and a lot of carnivores when a collection is taken

A third type of pyramid called a **Pyramid of Energy** Flow tends to resolve these problems. This approach necessitates measuring the caloric value of the different organisms that make up the community. It nicely shows how energy is continually decreasing along the food chain from producers to top level carnivores.

The pyramids of numbers and biomass may be upright or inverted depending upon the nature of the food chain in the particular ecosystem, whereas pyramids of energy are always upright.
In a forest ecosystem, however, the pyramid of numbers is somewhat different in shape. The producers, which are mainly large-sized trees, are lesser in number, and form the base of the pyramid. The herbivores, which are the fruit-eating birds, elephants, deer's etc. are more in number than the producers.

4. Which among the following can effectively be examples of 'Secondary Succession'?

1. Formation of a new Island after volcanic eruption
2. The renewal of a forest after a fire
3. A flooded land
4. The renewal of a crop after harvesting

Select the correct option

1. 1, 2 and 3
2. 2, 3 and 4
3. 1, 3 and 4
4. All

Solution: 2

Explanation:

Examples of secondary succession include:

- **The renewal of a forest after a fire**: The fire itself destroys a majority of different types of trees and plant life. Because seeds and roots and other plant and tree parts remain in and on the soil, gradually the plants and trees begin to grow again and eventually return to the state of the original ecosystem.
- **The renewal of a crop after harvesting**: A crop is completed harvested when it becomes ripe. Without new seeds being planted, the crop can regenerate the following year due to the plants and seeds that remained after harvesting.
- **A forest renews after logging**: A large amount of trees were chopped down by loggers in order to create building materials. Over time, trees grow in and the area returns to its previous state.
- **Renewal after disease:** A plant population can be very negatively affected by a variety of infectious plant diseases. If the entire population dies, but the soil and roots remain, it is possible for secondary succession to occur and for the population of those plants to to return.
- **A flood can ruin farmlands.** However, because the soil remains after the waters recede, over the course of many years a natural secondary succession can occur and the vegetation that had previously grown there can grow again.
- Plants can be very susceptible to attack from pests, particularly if there is an overpopulation of those pests. When this occurs, the plant population in one area can be completely destroyed. However, when the pest overpopulation is resolved, the plants are able to live again and thrive in the soil in which they previously had lived.

5. If the concentration of oxygen gets doubled in the atmosphere, what can be the possible effects of the same?

1. We will die young
2. Most insects will grow bigger in size
3. We will be less prone to sickness
4. Our Vehicle will give better mileage

Select the correct option

1. 1, 2 and 3
2. 1, 3 and 4
3. 1, 2, 3 and 4
4. 2, 3 and 4

Solution: 3

Explanation:

- More oxygen will generate more free radical that will exacerbate the aging process through Oxidative Stress. Oxidative Stress will interfere in numerous cellular processes like protein production, DNA replication etc. Hence age will get reduced.
- Immune system will get a boost as a result of oxidation and hence will help in fighting diseases (Less sickness)
- Many insects rely on gaseous diffusion for respiration therefore the maximum body size depends on the proportion of oxygen gas in the atmosphere. Hence size of insects will increase.
- Oxygen-enriched air improves engine performance by producing hotter reactions and reducing the proportion of nitrogen, which reduces heat transfer and hence will give better mileage.

6. The ecological footprint is a measure of human demand on the Earth's ecosystems. It measures-

1. How much of the biological capacity of the planet is demanded by a given human activity or population
2. Ecological Footprints is calculated for overall activity of a nation or population and activities such as industrialization etc.
3. The disadvantage of Ecological Footprint is that it cannot be calculated for individual people or area.

Select the wrong statement/s

1. 1 and 2
2. Only 2
3. 1 and 3
4. Only 3

Solution: 4

Explanation:

The Ecological Footprint is a resource accounting tool that measures how much biologically productive land and sea is used by a given population or activity, and compares this to how much land and sea is available. Productive land and sea areas support human demands for food, fibre, timber, energy, and space for infrastructure. These areas also absorb the waste products from the human economy. The Ecological Footprint measures the sum of these areas, wherever they physically occur on the planet. The Ecological Footprint is used widely as a management and communication tool by governments, businesses, educational institutions, and non-governmental organizations.

Ecological Footprint accounts answer a specific research question: how much of the biological capacity of the planet is demanded by a given human activity or population? To answer this question, the Ecological Footprint measures the amount of biologically productive land and water area an individual, a city, a country, a region, or all of humanity uses to produce the resources it consumes and to absorb the waste it generates with today's technology and resource management practices. This demand on the biosphere can be compared to biocapacity, a measure of the amount of biologically productive land and water available for human use. Biologically productive land includes areas such as cropland, forest, and fishing grounds, and excludes deserts, glaciers, and the open ocean

Ecological Footprints can be calculated for individual people, groups of people (such as a nation), and activities (such as manufacturing a product).

The Ecological Footprint of a person is calculated by considering all of the biological materials consumed, and all of the biological wastes generated, by that person in a given year. These materials and wastes each demand ecologically productive areas, such as cropland to grow potatoes, or forest to sequester fossil carbon dioxide emissions. All of these materials and wastes are then individually translated into an equivalent number of global hectares.

7. Which of the following describes the relationship of Mutualism?

1. Pollination
2. Rhizobium
3. Human and Bacteria
4. Zoochory

Select the correct code-

1. 1, 2 and 3
2. 2. 3 and 4
3. 2 and 4
4. All

Solution: 4

Explanation:

A mutualistic relationship is when two organisms of different species "work together," each benefiting from the relationship. In mycorrhizal associations between plant roots and fungi with the plant providing carbohydrates to the fungus in return for primarily phosphate but also nitrogenous compounds.
Other examples include rhizobia bacteria that fix nitrogen for leguminous plants in return for energy-containing carbohydrates
Pollination in which nectar or pollen (food resources) are traded for pollen dispersal (a service) or ant protection of aphids, where the aphids trade sugar-rich honeydew (a by-product of their mode of feeding on plant sap) in return for defense against predators such as ladybugs.
Zoochory is an example where animals disperse the seeds of plants. This is similar to pollination in that the plant produces food resources (for example, fleshy fruit, overabundance of seeds) for animals that disperse the seeds (service).

The bacteria and the human. A certain kind of bacteria lives in the intestines of humans and many other animals. The human cannot digest all of the food that it eats. The bacteria eat the food that the human cannot digest and partially digest it, allowing the human to finish the job. The bacteria benefit by getting food, and the human benefits by being able to digest the food it eats.

8. Bioluminescence is the production and emission of light by a living organism. Which of the following exhibit the phenomenon of Bioluminescence?

1. Krill
2. Fungi
3. Bacteria
4. Winged beetles
5. Octopus

Select the correct code/s

1. 1, 2, 4 and 5
2. 1, 3, 4 and 5
3. 2, 3, 4 and 4
4. All

Solution: 4

All are bioluminescent species. Winged Beetles are also called Fireflies. Specific types of bacteria and fungi show this property. The **Bioluminescent Octopus**, scientifically known as: ***Stauroteuthis syrtensis*****,** is a deep sea species that has been relatively little studied. **Krill** are bioluminescent animals having organs called photophores that can emit light.

9. 'A transition area between two adjacent but different landscape patches' is called as

1. Ecozone
2. Ecoregion
3. Ecotone
4. Ethology

Solution: 3, Definition of Ecotone

10. If you travel through the villages and interior of Central India and Northern India, the traditional Water Harvesting System to be witnessed will be-

1. Zing
2. Johad
3. Kunds
4. Surangam
5. Kere

Select the correct codes

1. 1, 2, and 3
2. 1, 3, 4 and 5
3. 2, 4 and 5
4. All

Solution: (a)

Explanation:

Zing- Ladakh

Johad- Central India

Kunds- Rajasthan

Surangam- Western Ghats

Kere- Karnataka

Current Affairs

11. Tropical cyclones occur in –

1. tropics only
2. tropics and sub tropics only
3. subtropics only
4. tropic, subtropics and extra-tropics

Solution- 4

In addition to tropical cyclones, there are two other classes of cyclones within the spectrum of cyclone types. These kinds of cyclones, known as extratropical cyclones and subtropical cyclones, can be stages a tropical cyclone passes through during its formation or dissipation. An extratropical cyclone is a storm that derives energy from horizontal temperature differences, which are typical in higher latitudes. A tropical cyclone can become extratropical as it moves toward higher latitudes if its energy source changes from heat released by condensation to differences in temperature between air masses; although not as frequently, an extratropical cyclone can transform into a subtropical storm, and from there into a tropical cyclone. From space, extratropical storms have a characteristic "comma-shaped" cloud pattern. Extratropical cyclones can also be dangerous when their low-pressure centres cause powerful winds and high seas

12. When water droplets freeze on ice crystals, process known as

1. Bergeron process
2. Snowflakes process
3. Ice Shelves process
4. Water crystallization

Solution- 1

13. Which of followings are rift valley-

1. Lake Tanganayika
2. Gulf of Aden
3. Lake Baikal
4. Black Sea

Select the correct code

1. 2 and 3
2. 1, 3 and 4
3. 2 and 4
4. 1 and 3

Solution- 4

Many of the world's largest lakes are located in rift valleys. Lake Baikal in Siberia, a World Heritage Site, lies in an active rift valley. Baikal is both the deepest lake in the world and, with 20% of all of the liquid freshwater on earth, has the greatest volume. Lake Tanganyika, second by both measures, is in the Albertine Rift, the westernmost arm of the active East African Rift. Lake Superior in North America, the largest freshwater lake by area, lies in the ancient and dormant Midcontinent Rift. The largest subglacial lake, Lake Vostok, may also lie in an ancient rift valley.

14. Below are the statements that differentiate the types of diabetes. If you notice your friend is a diabetic, then how will you differentiate if he/she is type 1 or type 2?

1. Your friend is having the most common type of diabetes.
2. His/Her familiar background shows strong hereditary reasons for being diabetic.

Select the correct code

1. Your friend is suffering from Type 2 diabetes
2. Your friends is suffering from Type 1 diabetes
3. Both
4. None

Solution- 1

Both are the symptoms of Type 2 diabetes. Type 2 is the most common form of diabetes mainly found in adults and constituting 90-95% as compared to type 1. Genetically both type 1 and type 2 can be found but type 2 has strong genetic correlation than type 1

15. Arrange the following countries from West to East (Horizontally) along Mediterranean Sea

1. Tunisia
2. Egypt
3. Jordan
4. Syria

Select the correct code

1. 1-2-3-4
2. 2-4-3-1
3. 3-4-2-1
4. **4.** 1-2-4-3

Solution- 1

Check the Map

16. A geographical indication (GI) is a name or sign used on certain products which corresponds to a specific geographical location or origin. Match the following Indian GI correctly

1. Bidriware- Kerala
2. Chanderi Fabric- Madhya Pradesh
3. Nirmal Paintings- Telangana
4. Kaipad Rice- Karnataka

Select the correct code

1. 1, 2, 3 and 4
2. 1, 3 and 4
3. 2 and 3
4. 1 and 4

Solution- 3

https://en.wikipedia.org/wiki/List_of_Geographical_Indications_in_India