

TARGET PT - 2019**ENVIRONMENT & ECOLOGY*****Answer Key***

Q. 1	(c)	Q. 14	(a)	Q. 27	(b)	Q. 40	(c)
Q. 2	(d)	Q. 15	(b)	Q. 28	(a)	Q. 41	(b)
Q. 3	(a)	Q. 16	(a)	Q. 29	(b)	Q. 42	(b)
Q. 4	(b)	Q. 17	(a)	Q. 30	(d)	Q. 43	(a)
Q. 5	(a)	Q. 18	(d)	Q. 31	(b)	Q. 44	(c)
Q. 6	(b)	Q. 19	(b)	Q. 32	(d)	Q. 45	(a)
Q. 7	(c)	Q. 20	(d)	Q. 33	(b)	Q. 46	(c)
Q. 8	(b)	Q. 21	(b)	Q. 34	(d)	Q. 47	(c)
Q. 9	(b)	Q. 22	(b)	Q. 35	(b)	Q. 48	(a)
Q. 10	(c)	Q. 23	(d)	Q. 36	(a)	Q. 49	(d)
Q. 11	(d)	Q. 24	(d)	Q. 37	(a)	Q. 50	(d)
Q. 12	(c)	Q. 25	(a)	Q. 38	(b)		
Q. 13	(d)	Q. 26	(a)	Q. 39	(a)		

DO NOT OPEN THIS TEST BOOKLET UNTIL YOU ARE ASKED TO DO SO

1. Correct Option: (c)

Explanation:

Branches of Ecology

On the basis of study of organism individually or in group, ecology may be sub-divided into following types:

- ▶ **Statement 2 is correct: Autecology:** It involves the study of an individual animal or plant throughout its life in relation to the habitat factors. For autecological studies one must have the knowledge of nutrition, growth, reproduction and development of that individual.
- ▶ **Statement 1 is correct: Synecology:** If composition and behaviour of plant communities and their relationship to the environment are studied, the subject is called synecology
- ▶ Synecology is often further subdivided into aquatic and terrestrial ecology.
- ▶ The aquatic ecology includes fresh water ecology, estuarine ecology and marine ecology.
- ▶ Terrestrial ecology, subdivided further into areas such as forest ecology, grassland ecology, cropland ecology and desert ecology, is concerned with terrestrial (land) ecosystems — their microclimate, soil chemistry, nutrient, hydrological cycle and productivity.

2. Correct Option: (d)

Explanation:

About Ecosystem

- ▶ **Statement 4 is correct:** An ecosystem is a self-sustaining structural and functional unit of the biosphere that facilitates survival. It is a collection of all living and non-living components in a particular area. The living components of the environment are known as biotic factors which include plants, animals, and micro-organisms. The non-living components are termed as abiotic factors which include soil, land air, etc.
- ▶ **Statement 1 is incorrect:** Non-living components of the environment are also a part of ecosystem.
- ▶ **Statement 2 is correct:** Edaphic is a component relating to soil,

especially as it affects living organisms. Edaphic characteristics include such factors as water content, acidity, aeration, and the availability of nutrients. Influenced by factors inherent in the soil rather than by climatic factors.

- ▶ **Statement 3 is correct:** The terrestrial part of the biosphere is divisible into enormous regions called biomes, which are characterized, by distinct climate [precipitation and temperature mainly], vegetation, animal life and general soil type. No two biomes are alike. The climate determines the boundaries of a biome and abundance of plants and animals found in each one of them. The most important climatic factors are temperature and precipitation.

3. Correct Option: (a)

Explanation

Ecosystem Stability

Ecosystem stability refers to the capability of a natural ecosystem to apply self-regulating mechanism so as to return to a steady state after an outside disturbance. Ecosystem stability means there is a balance between production and consumption of each element in the ecosystem.

The Principles of Ecosystem Stability are:

Ecosystems dispose of waste and replenish nutrients by recycling all elements.

Ecosystems use sunlight as their source of energy.

The size of a consumer population is maintained such that overgrazing and other forms of overuse do not occur.

Biodiversity is maintained.

Some of the important characteristics of a stable ecosystem are:

- ▶ **Statement 1 is correct:** They are in dynamic equilibrium.
- ▶ **Statement 2 is correct:** They are mature ecosystems.
- ▶ **Statement 3 is correct:** These ecosystems have high inertia.
- ▶ **Statement 4 is incorrect:** These ecosystems have high (not low) species diversity.
- ▶ They have diversity of food web.

Smart Solution:

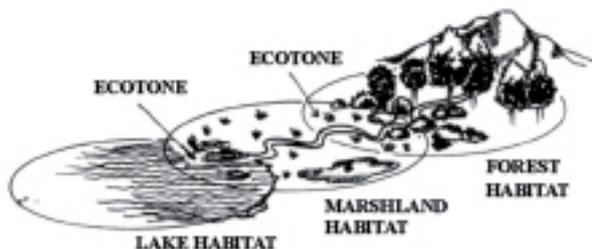
If a candidate knows that these ecosystems have high (not low) species diversity CODE (b), (c) and (d) can be straightaway rejected

4. Correct Option: (b)

Explanation:

About Ecotone

- ▶ **Statement 1 is correct:** An ecotone acts as the boundary or barrier between two or more biomes. It is the area where two distinct types of environments merge and blend. It has the conditions intermediate to the adjacent ecosystems. Hence it is a zone of tension.
- ▶ **Statement 2 is correct:** Mangrove forests represent an ecotone between marine and terrestrial ecosystem. Grassland ecosystem forms the ecotone which is transitional zone between forest and desert ecosystem.
- ▶ **Statement 3 is incorrect:** Edge effect occurs when number of species and the population density of some species rather than the territorial area are much greater in the ecotone than the adjacent communities.



5. Correct Option: (a)

Explanation:

Ecological Niche

- ▶ **Statement 1 is correct:** An ecological niche is the role and position a species has in its environment; how it meets its needs for food and shelter, how it survives, and how it reproduces. A species' niche includes all of its interactions with the biotic and abiotic factors of its environment. Biotic factors are living things, while abiotic factors are nonliving things. It is advantageous for a species to occupy a unique niche in an ecosystem because it reduces the amount of competition for resources that species will encounter.

- ▶ **Statement 2 is correct:** Diverse the niche in ecosystem ensures the stability and continuity. That is, an ecosystem with high biodiversity is more likely to be stable than an ecosystem with low biodiversity. Ecosystem stability is an ecosystem's ability to recover from a disaster. Imagine that a disaster wipes out a species. If the ecosystem has high biodiversity, a new species will quickly move into the niche occupied by the old species, and the ecosystem as a whole will recover quickly. If the ecosystem had low biodiversity the recovery might be much slower.
- ▶ **Statement 3 is incorrect:** According to the competitive exclusion principle, no two species can occupy the same niche in the same environment for a long time as they become competition for each other in course of time. The parameters of a realized niche are described by the realized niche width of that species.

6. Correct Option: (b)

Explanation:

- ▶ **Statement 1 is incorrect:** The natural habitat of a mammal is called its ecological habitat.
- ▶ **Statement 2 is correct:** Sere is the entire sequence of ecological communities successively occupying an area from the initial stage to the complex.
- ▶ **Statement 3 is incorrect:** The functional role of a species is called the niche.
- ▶ **Statement 4 is incorrect:** The place of a species in a food chain is indicated by Ecological Pyramids.

7. Correct Option: (c)

Explanation:

Ecosystem Functions

- ▶ **Statement 1 is incorrect:** Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis. Gross primary productivity minus respiration losses (RES) is the net primary productivity (NPP).
- ▶ **NPP = GPP - RES**
- ▶ NPP measures the mass of the new plant growth (chemically-fixed carbon) produced during a given interval. Change in NPP may change with vegetation health, so NPP rates were used to analyze the overall trend of carbon uptake in this region over the past ten years.

- ▶ **Statement 2 is correct:** Catabolism is destructive metabolism, the breaking down in living organisms of more complex substances into similar ones, with the release of energy.
- ▶ Decomposers and transformers are the living components of the ecosystem and they are fungi and bacteria. Decomposers attack the dead remains of producers and consumers and degrade the complex organic substances into simpler compounds. During process of catabolism, the extracellular enzymes released by bacteria and fungi carry out enzymatic conversion of the decomposing detritus to simpler compounds and inorganic substances.
- ▶ **Statement 3 is correct:** Secondary productivity is defined as the rate of formation of new organic matter by consumers. Secondary production refers to the net quantity of energy transferred and stored in the somatic and reproductive tissues of heterotrophs over a period of time. Some heterotrophs (consumers and decomposers) feed on net primary production and some on other heterotrophic organisms. Thus, productivity by heterotrophic organisms in the ecosystem is called secondary productivity.

8. Correct Option: (b)

Explanation:

About Herbivores Marine Animal

- ▶ Marine herbivores are found within four groups of species in the animal kingdom -- invertebrates, fish, reptiles and mammals -- and include zooplankton, mollusks, the green sea turtle, the marine iguana and some fish species. Manatees and dugongs are the only herbivores among marine mammals
- ▶ **Statement 1, 4 and 5 are correct:** Sea Cows, Manatees and Dugongs are herbivores marine mammals. They make their living grazing on sea grasses, marine algae in coastal temperate and tropical waters of North America, Asia and Africa.
- ▶ **Statement 2 and 3 are incorrect:** Seals and sea lions come under the order of carnivore.

9. Correct Option: (b)

Explanation:

About Grasslands

- ▶ Grasslands are characterized as lands dominated by grasses rather than large shrubs or trees. here are two main divisions of grasslands:
- ▶ Tropical grasslands or savannahs
- ▶ Temperate grasslands
- ▶ **Statement 1 is incorrect:** These are formed over the regions of moderate temperature and moderate rainfall. It is an intermediate between a forest ecosystem and a desert ecosystem.
- ▶ **Statement 2 is correct:** Regular fires promote the growth of native grasses but limit the growth of trees as gradually over a period of time due to repeated fire events the soil loses its fertility and is rendered infertile.
- ▶ **Statement 3 is correct:** Grasslands are important for maintaining the richness and size of livestock population as they provide the primary source of nutrition to livestock in the form of grasses which ensure their healthy culturability.
- ▶ **Statement 4 is correct:** The grasses found here can either be tall or short depending on the location of the grassland and the amount of rain they receive. Historically, the tall-grass prairie consisted of big and little bluestem, switch grass, and Indian grass. These species thrive in zones of 30-40 inch annual precipitation and reach 6-8 feet in height. Within this zone, cord grass (*Stipa* spp.) and reed grass (*Phragmites* spp.) are dominant species in the wet lands. Thousands of years of tall grass dominance (owing to managed and natural fires preventing forest development) created a rich, fertile soil which now characterizes the corn belt of the USA. The short grass prairies found in the 15-25 inch annual precipitation zone.

10. Correct Option: (c)

Explanation:

About Coral Reefs

Coral reefs are found in circum-tropical shallow tropical waters along the shores of islands and continents. The reef substrate is mainly composed of calcium carbonate from living and dead corals. Many other invertebrates, vertebrates, and plants live in close association to the corals, with tight resource coupling

and recycling, allowing coral reefs to have extremely high productivity and biodiversity, such that they are referred to as 'the Tropical Rainforests of the Oceans'.

Corals live in very nutrient poor waters and have certain zones of tolerance to water temperature, salinity, UV radiation, opacity, and nutrient quantities.

- ▶ **Statement 1 is incorrect:** Zooxanthellae is an algae not bacteria, live symbiotically within the coral polyp tissues and assist the coral in nutrient production through its photosynthetic activities.
- ▶ **Statement 2 is incorrect:** Majority of corals are found in tropical and sub-tropical areas as they require moderately high temperature for growth. Great Australian Reef is the largest coral reef in the world.

Geographical Conditions Required

- ▶ Corals generally flourish in clear tropical oceans usually between 30°N and 30°S of the equator.
- ▶ They grow best in the brightly lighted water about 5 to 10 meters deep. The suspended particles interfere with feeding.
- ▶ Corals live in saline water (27%).
- ▶ Coral reef can from to depth of 90 meters, but growth rate declines rapidly after 5 to 10 meters depths.
- ▶ The reef building corals are found within the 21°C isotherm.
- ▶ Corals are not near the mouths of rivers.
- ▶ Temperature below 18°C causes their death.
- ▶ Individual coral organisms are however, found in some cold, high latitudes waters as well (Norway and Cap Verde Island and off New Zealand and Japan).

Healthy coral reefs provide:

- ▶ **Habitat:** Home to over 1 million diverse aquatic species, including thousands of fish species
- ▶ **Income:** Billions of dollars and millions of jobs in over 100 countries around the world
- ▶ **Food:** For people living near coral reefs, especially on small islands
- ▶ **Protection:** A natural barrier protecting coastal cities, communities and beaches
- ▶ **Medicine:** The potential for treatments for many of the world's most prevalent and dangerous illnesses and diseases.

11. Correct Option: (d)

Explanation:

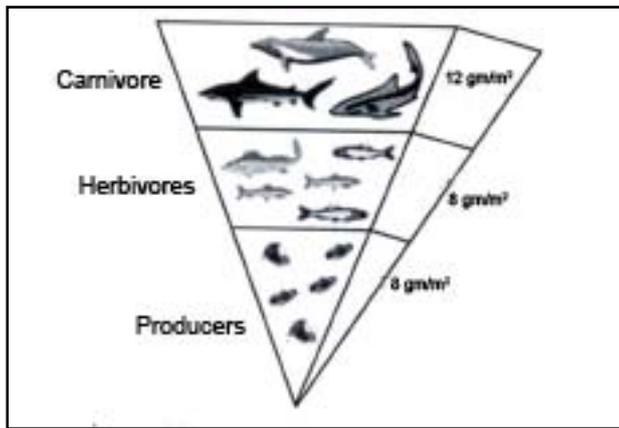
Ecological Pyramids

Ecological pyramid is also known as trophic pyramid or energy pyramid; it is graphically represented to show the biomass or productivity of the biomass at each trophic level in an ecosystem. They are graphical representations of the structure of trophic levels of ecosystems. All ecological pyramids begin at the bottom with the producers and proceed through different trophic levels.

Ecological pyramids begin with the producers at the bottom like plants and they proceed to various trophic levels like herbivores consume plants, carnivores prey on herbivores and so on. The highest level is at the top of the food chain.

There are 3 types of ecological pyramids as described as follows:

- Pyramid of energy
- Pyramid of numbers and
- Pyramid of biomass.
- ▶ **Statement 1 is correct:** In pyramid of biomass, individuals in each trophic level are weighed instead of being counted. This gives us a pyramid of biomass i.e. the total dry weight of all organisms at each trophic level at a particular time. This overcomes the size difference problem because all kinds of organisms at a trophic level are weighed.
- ▶ **Statement 2 is correct:** In aquatic ecosystems the pyramid of biomass is inverted. Here the consumer biomass at any instant actually exceeding the producer biomass and the pyramid assumes the inverted shape.
- ▶ **Statement 3 is correct:** Generally, decomposers are the most recognized players in the food chain as well as the energy pyramid. The decomposers do not share the energy with any members of the ecosystem but is transferred to the soil when they die or is taken away by the organisms that eat them. It is clear that survival would be difficult if the food chain lacked decomposers and detritivores. The energy cycle would not continue as the energy would be lost after the death of plants and animals. However, they could essentially appear on any level except the first as they are heterotrophs, unless the specific decomposer also happens to be photosynthetic or thermo synthetic. Therefore they do not form part of the ecological pyramids.



12. Correct Option: (c)

Explanation:

Trophic Levels

A trophic level is the group of organisms within an ecosystem which occupy the same level in a food chain. There are five main trophic levels within a food chain, each of which differs in its nutritional relationship with the primary energy source. The primary energy source in any ecosystem is the Sun (although there are exceptions in deep sea ecosystems).

- ▶ **Statement 1 is incorrect:** Energy in an ecosystem flows unidirectional i.e. from producer level to consumer level. Therefore the pyramid of energy is always upright. 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.
- ▶ **Statement 2 is incorrect:** In an ecosystem there is always a very low chance of having more than six trophic levels as hardly any energy is left to support the number of organism.
- ▶ **Statement 3 is correct:** Food chain traces only one pathway of the food for organisms. If it breaks in any part the entire chain will be affected. But in case of food web there are many interlinked food chains. If any chain fails there will be continuity with other chains. Therefore food webs are more stable than the food chains. For example, grasses may serve food for rabbit or grasshopper or goat or cow.



13. Correct Option: (d)

Explanation:

Energy flow in an Ecosystem

- ▶ **Statement 1 is incorrect:** Energy is the basic force responsible for all metabolic activities. The flow of energy from producer to consumer is called energy flow which is unidirectional, i.e., it cannot be transferred in reverse direction under any circumstance.
- ▶ **Statement 2 is incorrect:** Trophic level interaction deals with how the members of an ecosystem are connected based on nutritional needs. The amount of energy flow decreases (not increases) with successive trophic levels. There is a loss of some energy in the form of unusable heat at each trophic level so that energy level decreases from the first trophic level upwards. On average about 10 percent of net energy production at one trophic level is passed on to the next level. Processes that reduce the energy transferred between trophic levels include respiration, growth and reproduction, defecation, and non - predatory death (organisms that die but are not eaten by consumers). As a result there are usually four or five trophic levels and seldom more than six as beyond that very little energy is left to support any organism.

14. Correct Option: (a)

Explanation:

- ▶ **Statement 1 is correct:** Grazing Food Chain: Grazing food chain (GFC) is the most common food chain. It is also called predator food chain as predation occurs at every step. This food chain consists of producers, consumers and decomposers. Consumers are often of 3 to 5 types: first order (primary), second order (secondary), third order (tertiary), fourth order (quaternary) consumers. However, in grazing food chain the green plants form the base with herbivores as the primary consumers always.

Grasses .. Grasshopper .. Frog .. Snake .. Hawk/Eagle

- ▶ **Statement 2 is correct:** Detritus Food Chain: Detritus food chain (DFC) begins with detritus or dead organic matter. The food energy present in detritus passes into detritivores and decomposers who feed over it. Detritivores and decomposers are consumed by smaller carnivores which in turn become food for larger carnivores and so on. Eg:

Detritus .. Earthworm .. Sparrow .. Falcon

- ▶ **Parasitic Food Chain:** Parasitic food chain also called auxiliary food chain; it begins with host and usually ends in parasite.
- ▶ **Statement 3 is incorrect:** Grazing and detritus food chains are interlinked. The initial energy for detritus food chain is from the dead remains from the grazing food chain.

15. Correct Option: (b)

Explanation:

Predators

- ▶ Predators are wild animals that hunt, or prey on, other animals. All animals need food to live. Predator animals need the flesh of the animals that they kill to survive. Weasels, hawks, wolves, mountain lions, and grizzly bears are all predators. Predators are carnivores, which means their diet consists of meat.
- ▶ **Statement 2 is correct:** Apex predators serve to keep prey numbers in check. By weeding out the slow, weak, and dying animals, they increase the health of the population as a whole.

- ▶ **Statement 1 is correct:** By consuming the food from lower trophic they derive the energy from it. Therefore they help in transferring energy from lower level to higher trophics.
- ▶ **Statement 3 is incorrect:** Predators can't prevent the extinction of species. As they keep the prey population under control, the inter-specific competition gets reduced among the prey species.

16. Correct Option: (a)

Explanation:

Biotic Components

- ▶ Biotic component of ecosystem consist of living components. The different biotic components are connected through food and a number of other relations. The following three main types are :
- ▶ **Producers:** Autotrophic organisms are called producers. They are green plants and certain bacteria. They are capable of synthesizing organic food from inorganic raw materials with the help of solar energy. They provide food, shelter and oxygen to the living organisms. Some of the examples of producer are herbs, shrubs, grasses and trees.
- ▶ **Option (a) is correct: Consumers:** They are animals that feeds on other organisms. They are also called heterotrophs. They are divided into two types, herbivorous and carnivorous. Herbivores obtain their food directly from green plants or producers. So, they are also known as primary consumer. For examples, deer feed on grass. Here, deer is a primary consumer and grass is a producer. Carnivores feed on herbivores. For example, jackal feed on herbivorous animals like deer, goat etc. Here, jackal is a primary carnivorous or secondary consumer. Here again, these secondary consumers are eaten by top consumers like lion, tiger etc. This are known as top consumers because they are not eaten by other animals.
- ▶ **Decomposers:** They feed on dead bodies of organisms and organic wastes of living organisms. They absorb some of the product while release most of the inorganic compounds into environment. These inorganic compounds are used by the producers to produce food. Some of the examples of decomposers are maggots, bacteria, slugs, etc.

17. Correct Option: (a)

Explanation:

Consumers

- ▶ Consumers are animals that feed on other organisms. They are also called heterotrophs. They are divided into two types, herbivorous and carnivorous. Herbivores obtain their food directly from green plants or producers. So, they are also known as primary consumer. For examples, deer feed on grass. Here, deer is a primary consumer and grass is a producer. Carnivores feed on herbivores. For example, jackal feed on herbivorous animals like deer, goat etc. Here, jackal is a secondary consumer. These secondary consumers are eaten by top consumers like lion, tiger etc. This are known as top consumers because they are not eaten by other animals.
- ▶ **Option (a) is correct:** Consumers that are herbivores rely upon the chemical energy stored in organic molecules produced by photosynthesis. Autotrophs, store chemical energy in carbohydrate food molecules (organic molecules) they build themselves. Food provides both the energy to do work and the carbon to build bodies. Because most autotrophs transform sunlight to make food, we call the process they use photosynthesis. Only three groups of organisms - plants, algae, and some bacteria - are capable of this life-giving energy transformation. Autotrophs make food for their own use, but they make enough to support other life as well. Almost all other organisms depend absolutely on these three groups for the food they produce. The producers, as autotrophs are also known, begin food chains which feed all life.

18. Correct Option: (d)

Explanation:

Ecosystem Functions

- ▶ The food that humans eat contains all the energy and nutrients that we need in order to survive. All living things require energy for growth, reproduction, repair and anything else that is necessary for survival. The food that humans eat comes from either plants or animals. Some organisms produce their own food while others need to consume other organisms to obtain their nutrients and energy.

Energy Flow:

- ▶ The flow of energy through an ecosystem is described as one-way or linear. This means that energy enters the ecosystem and passes through it without being recycled. Energy enters in the form of light (via photosynthesis) and leaves as heat. Heat is not used as a source of energy by living organisms
- ▶ In an ecosystem energy flows from the sun to producers to herbivores and then to carnivores.
- ▶ Energy flows through an ecosystem in one direction, which is called the food chain. It's like a pyramid. At the bottom are producers. The producers contain the most energy gotten from the sun. The next are primary consumers. Consumers obtain energy by eating the producers. The next layer is the secondary consumers.

Nutrient Cycle:

- ▶ A nutrient cycle (or ecological recycling) is the movement and exchange of organic and inorganic matter back into the production of matter. Energy flow is a unidirectional and noncyclic pathway, whereas the movement of mineral nutrients is cyclic. **Mineral cycles include the carbon cycle, sulfur cycle, nitrogen cycle, water cycle, phosphorus cycle, oxygen cycle, among others that continually recycle along with other mineral nutrients into productive ecological nutrition**

19. Correct Option: (b)

Explanation:

About Parasitic Food Chain

- ▶ Parasitic food chain starts from herbivore but food energy passes from larger to smaller organism without outright killing as in case of predator. Hence, the larger animals are considered to be the hosts and the smaller animals which fulfil their nutritional requirements from the hosts are considered as parasites.
- ▶ In this type of food chain either the producer or the consumer is parasitized and therefore the food passes to the smaller organism. The energy transfer through this kind of food chain is not significant.
- ▶ **Statement 2 and 3 are correct:** Example:
- ▶ Trees - Fruit eating birds - Lice and bugs - Bacteria and fungi.
- ▶ Zebra - Nematode - Filamentous

bacteria.

- ▶ Radiant energy of the sun -Green Plants -Sheep - Liver fluke.
- ▶ **Statement 1 is incorrect:** This is an example for detritus food chain. Detritus food chain starts from dead organic matter of decaying animals and plant bodies to the microorganisms and then to detritus feeding organism are called decomposers or detrivores to other predators.

20. Correct Option: (d)

Explanation:

Food Chain

- ▶ The transfer of food energy from the producers, through a series of organisms (herbivores to carnivores to decomposers) with repeated eating and being eaten, is known as food chain. In nature, basically two types of food chains are recognized – grazing food chain and detritus food chain.
- ▶ **Grazing Food Chain:** This type of food chain starts from the living green plants goes to grazing herbivores, and on to carnivores. Ecosystems with such type of food chain are directly dependent on an influx of solar radiation. This type of chain thus depends on autotrophic energy capture and the movement of this captured energy to herbivores. Most of the ecosystems in nature follow this type of food chain. The phytoplanktons →zooplanktons →Fish sequence or the grasses →cow →tiger sequences are the examples, of grazing food chain.
- ▶ **Statement 1 and 2 are incorrect:**
Detritus Food Chain: This type of food chain goes from dead organic matter into mi-croorganisms and then to organisms feeding on detritus (detrivores) and their predators. Such ecosystems are thus less dependent on direct solar energy. These depend chiefly on the influx of organic matter produced in another system. For example, such type of food chain operates in the decomposing accumulated litter in a temperate forest.

21. Correct Option: (b)

Explanation:

Species Interaction

- ▶ **Option (b) is correct:** Interaction (between species) refers to positive and negative associations between species that favour or inhibit mutual growth and evolution of populations. It may take the form of competition, predation, parasitism, commensalism or mutualism.
- ▶ An association of two species, in which both species are benefited, is called mutualism. Example: Coral and zooxanthellae.
- ▶ Commensalism is a relationship between two species where one species is benefited, while the other neither gets any benefit nor is adversely affected under normal conditions. Example: Remora Fish and shark.
- ▶ Interaction between two species, where both suffer adverse effects, is known as competition. Example: lions and cheetahs of the African savanna compete for the same antelope and gazelle prey.

22. Correct Option: (b)

Explanation:

Effect of Abiotic Components on Plants

- ▶ The abiotic factors that affect plant growth and development include topography, soil, and climatic factors. They are the non-living components of the environment which, along with the biotic or living factors, determine the extent in which the genetic factor is expressed in the plant.
- ▶ **Statement 1 is incorrect:** Light intensity is crucial for plant growth and often fluctuates on a small time scale due to altering climate conditions or sun flecks. An increase in light intensity leads to a pronounced increase of root-shoot-ratio as root growth reacts strongly and rapidly to an increase of light intensity due to facilitated import of carbon. Root growth is closely related to carbon import and hence to light conditions at the shoot. Carbon gain in roots is realized predominantly by import from the shoot via the phloem, while the major loss of root carbon occurs via respiration associated with growth and ion uptake.
- ▶ **Statement 2 is correct:** In most of the plants protoplasmic activity cannot be maintained at temperatures above

40 degree centigrade. This leads to coagulation of protoplasmic proteins and thus cessation of many vital phenomenon slightly above and below 40 degrees. Excessive high temperature disturbs the balance between respiration and photosynthesis thereby causing depletion of food resulting in greater susceptibility to fungal and bacterial attack. It further leads to desiccation of plant tissues and depletion of moisture resulting in death of plant due to coagulation of protoplasmic proteins.

- ▶ **Statement 3 is correct:** As a result of frost, water in the intercellular spaces of the plant gets frozen into ice which withdraws water from the interior of the cells. This results in increasing concentration of salts and dehydration of cells. Thus coagulation and precipitation of the cell colloid results in death of the plant.

23. Correct Option: (d)

Explanation:

Ecotone

- ▶ Ecotone is a zone of junction between two or more diverse ecosystems. It has the conditions intermediate to the adjacent ecosystems. Hence it is a zone of tension.
- ▶ Some of the examples for the ecotone are,
- ▶ **Statement 1 is correct:** Grassland ecosystem forms the ecotone which is transitional zone between forest and desert ecosystem.
- ▶ **Statement 2 is correct:** Shallow waters at the bottom of continental shelf forms the transitional zone for the soft bottom and hard bottom marine communities.
- ▶ **Statement 3 is correct:** Meadows near the water stream forms abode for the both the terrestrial and aquatic communities of fauna. Therefore it forms the ecotone.
- ▶ **Statement 4 is correct:** Estuary is an area formed at the junction of marine water and fresh water mixes.

24. Correct Option: (d)

Explanation:

Levels of Biodiversity:

- ▶ **Statements 1, 2 and 3 are correct:** Genetic Diversity: It is concerned with the variation in genes within a particular species. It is the total number of genetic characteristics in the genetic makeup of a species. Genetic diversity allows species to adapt to changing environments. This diversity aims to ensure that some species survive drastic changes and thus carry on desirable genes. The survival of individuals ensures the survival of the population.
- ▶ **Species Diversity:** It refers to the variety of plant and animal species present in a community or ecosystem. Species diversity varies across the world and in different ecosystems. Species diversity is very high in: Tropical rainforests, coastal zones. Species diversity is low in: small isolated islands and Polar Regions.
- ▶ **Ecosystem Diversity:** It refers to the variety of ecosystems found in a given area or region.

25. Correct Option: (a)

Explanation:

Lichens

- ▶ **Statement 1 is correct:** Lichen is a peculiar combination of an alga and a fungus- the two live deriving mutual benefits. They are group of grayish green plants which grow on rocks, tree-trunks, dead wood etc.
- ▶ The alga manufactures carbohydrate food which becomes available to the fungus, and the latter absorbs and retains water and thus keeps the algal cells moist. So it is a example of symbiosis.
- ▶ They are most common in wetlands, rare in rivers and streams and are not found in ground water.
- ▶ A Bio-indicator is any species (an indicator species) or group of species whose function, population, or status can reveal the qualitative status of the environment.
- ▶ **Statement 2 is incorrect:** The disappearance (not increase)of lichens in a forest may indicate environmental stresses, such as high levels of sulfur dioxide, sulfur-based pollutants, and nitrogen oxides.

26. Correct Option: (a)

Explanation:

About Behavioral Adaptations

- ▶ **Statement 2 is incorrect:** All organisms have adaptations that help them survive and thrive. Some adaptations are structural. Structural adaptations are physical features of an organism like the bill on a bird or the fur on a bear. Other adaptations are behavioral. Having striped fur for camouflage on the female one to attract its male counterpart for reproduction is a structural adaptation.
- ▶ **Statement 1 and 3 are correct:** Behavioral adaptations are the things organisms do to survive such as migration, hibernation, camouflage, nocturnal and boreal type of living.
- ▶ **Statement 4 is incorrect:** The animals which live in hot and dry climates adapt some structural or physical changes to survive in such time of climate. To prevent water loss from the body their bodies are reduced in size.

27. Correct Option: (b)

Explanation:

- ▶ **Statement 2 is correct:** Amensalism is a negative association between two species in which one species harms or restricts the other species without itself being adversely affected or harmed by the presence of the other species. Organisms that secrete antibiotics and the species that get inhibited by the antibiotics are examples of Amensalism.
- ▶ **Statement 1 is incorrect:** Mutualism or interspecies reciprocal altruism is a long-term relationship between individuals of different species where both individuals benefit from each other but their relationship is not obligatory. An example of mutualism is the relationship between the ocellaris clownfish that dwell among the tentacles of Ritteri seaanemones.
- ▶ **Statement 2 is incorrect:** In a parasitic relationship, the parasite benefits while the host is harmed. Parasitism takes many forms, from endoparasites that live within the host's body to ectoparasites and parasitic castrators that live on its surface and micro predators like mosquitoes that visit intermittently.
- ▶ **Statement 4 is incorrect:** Commensalism describes a relationship between two

living organisms where one benefits and the other is not significantly harmed or helped. Commensal relationships may involve one organism using another for transportation or for housing, or it may also involve one organism using something another created, after its death. Examples of metabiosis are hermit crabs using gastropod shells to protect their bodies, and spiders building their webs on plants.

28. Correct Option: (a)

Explanation:

Symbiosis and Mutualism

- ▶ **Statement 1 is correct:** The condition in which there is a close physical association between the individuals of a pair of species is called symbiosis. The term symbiosis identifies an intimate, close association between species in which the large majority or entire life cycle of one species occurs within or in very close association with another. Often, one species (the symbiont) is not free-living, but inhabits the body of another species (the host).
- ▶ **Statement 2 is incorrect:** An association of two species, in which both species are benefited, is called mutualism. Mutualism is a functional association, not merely living together. Mutualism may be obligate (species are completely dependent upon each other) or facultative (one species may survive even in the absence of the other partner species). The term mutualism is not synonymous with symbiosis, cooperation, or facilitation, although ecological and evolutionary parallels do occur among these forms of interaction.
- ▶ A mutualism can also be a symbiosis, and many symbioses are also mutualistic, but not all symbioses are mutualisms and not all mutualisms are symbiosis objectives.

29. Correct Option: (b)

Explanation:

Competition

- ▶ Competition is most typically considered the interaction of individuals that vie for a common resource that is in limited supply, but more generally can be defined as the direct or indirect interaction of organisms that leads to a change in fitness when the organisms share the same resource. The

outcome usually has negative effects on the weaker competitors. There are three major forms of competition.

- ▶ **Statement 1 is incorrect:** Algae and lichens are living in symbiotic life i.e. benefit from each other. (Symbiotic relation)
- ▶ **Statement 3 is incorrect:** Ticks are ectoparasites living on the body of cattle to suck blood. (Parasitic relation)
- ▶ **Statement 2 is correct:** Cheetah and Lions are in competition to grab their prey have overlapping prey source. (Competitive relation)

30. Correct Option: (d)

Explanation:

Ecological Succession

- ▶ **Statement 1 is correct:** Ecological succession, is a fundamental concept in ecology, the process by which the structure of a biological community evolves naturally over time, through a sequential change following a stable environment, from a simpler level of organization to a more complex community. It is a long-term cumulative, directional and largely predictable process of natural development of different communities at the same site, in a definite sequence, over a period of time.
- ▶ Such changes occur either in response to an environmental change or induced by the intrinsic properties of the community itself.
- ▶ Two different types of succession—primary and secondary—have been distinguished. Primary succession occurs in essentially lifeless areas—regions in which the soil is incapable of sustaining life as a result of such factors as lava flows, newly formed sand dunes, or rocks left from a retreating glacier. Secondary succession occurs in areas where a community that previously existed has been removed; it is typified by smaller-scale disturbances that do not eliminate all life and nutrients from the environment.
- ▶ **Statement 2 is incorrect:** Succession continues till a community develops maximum equilibrium to the environment. It is called climax community. It is thought to result when the web of biotic interactions becomes so intricate that no other species can be admitted. The

newer species are superseded, in turn, by still newer species. The first set of species or community that develops in a bare area in ecological succession is the pioneer community.

- ▶ **Statement 3 is correct:** Succession is characterized by the following
 - ▶ Increased productivity
 - ▶ The shift of nutrients from the reservoirs
 - ▶ Increased diversity of organisms with the increased niche development
 - ▶ A gradual increase in the complexity of food webs

31. Correct Option: (b)

Explanation:

Ecological Succession

- ▶ Succession is a universal process of directional change in vegetation, on a ecological time scale. Succession occurs when a series of communities replace one another due to large scale destruction either natural or manmade. This process continues— one community replacing another community, until a stable, mature community develops. Succession is a progressive series of changes which leads to the establishment of a relatively stable climax community.
- ▶ **Option (b) is correct:** Successional dynamics beginning with colonization of an area that has not been previously occupied by an ecological community, such as newly exposed rock or sand surfaces, lava flows, newly exposed glacial tills, etc., are referred to as primary succession. The stages of primary succession include pioneer plants (lichens and mosses), grassy stage, smaller shrubs, and trees.
- ▶ **Option (c) is incorrect:** Successional dynamics following severe disturbance or removal of a pre-existing community are called secondary succession. Dynamics in secondary succession are strongly influenced by pre-disturbance conditions, including soil development, seed banks, remaining organic matter, and residual living organisms.
- ▶ **Option (a) is incorrect:** The final or stable community in a sere is the climax community or climatic vegetation. It is self-perpetuating and in equilibrium with the physical habitat. There is no net

annual accumulation of organic matter in a climax community. The annual production and use of energy is balanced in such a community.

32. Correct Option: (d)

Explanation:

Invasive species

- ▶ **Statement 2 is correct:** An invasive species can be any kind of living organism—an amphibian (like the cane toad), plant, insect, fish, fungus, bacteria, or even an organism's seeds or eggs—that is not native to an ecosystem and causes harm. They can harm the environment, the economy, or even human health. Species that grow and reproduce quickly, and spread aggressively, with potential to cause harm, are given the label "invasive."
- ▶ An invasive species does not necessarily have to come from another country. For example, lake trout are native to the Great Lakes, but are considered to be an invasive species in Yellowstone Lake in Wyoming because they compete with native cutthroat trout for habitat.
- ▶ **Statement 1 is correct:** Exotic species become invasive in nature when the area does not have its natural predator to prey upon the invasion. In their new ecosystems, invasive alien species become predators, competitors, parasites, hybridizers, and diseases of our native and domesticated plants and animals
- ▶ The indirect threats of invasive species:
- ▶ **Statement 3 is correct:** Changing food webs: Invasive species can change the food web in an ecosystem by destroying or replacing native food sources. The invasive species may provide little to no food value for wildlife.
- ▶ Decreasing biodiversity: Invasive species can alter the abundance or diversity of species that are important habitat for native wildlife. Aggressive plant species like kudzu can quickly replace a diverse ecosystem with a monoculture of just kudzu.
- ▶ Altering ecosystem conditions: Some invasive species are capable of changing the conditions in an ecosystem, such as changing soil chemistry or the intensity

of wildfires.

33. Correct Option: (b)

Explanation:

Seaweeds

- ▶ "Seaweeds" are a group of photoautotrophic, multi-cellular algae occurring in marine environments. Basically, they are simple organisms that can perform photosynthesis.
- ▶ **Statement 1 is incorrect:** The Seaweeds are macrophytic algae, a primitive type of plants lacking true roots, stems and leaves. The word seaweed gives the wrong impression that it is a useless plant. However, seaweeds are wonder plants of the sea and highly useful plants.
- ▶ **Statement 2 is correct:** Seaweeds grow in the shallow waters. Seaweed planted in shallow water near the surface (30 to 50 centimeters) receives plenty of sunlight and its growth will be good. Seaweed planted in deep water (more than 1 meter from the sea surface) does not get enough sunlight and its growth will be poor.
- ▶ **Statement 3 is correct:** Seaweeds provide new renewable source of food, energy, chemicals and medicines. It also provides valuable source of raw material for industries like health food, medicines, pharmaceuticals, textiles, fertilizers, animal feed etc.
- ▶ **Statement 4 is correct:** Seaweeds are rich in minerals, vitamins, trace elements and bioactive substances, seaweeds are called medical food of the 21st century.
- ▶ Seaweeds grow abundantly along the Tamil Nadu and Gujarat coasts and around Lakshadweep and Andaman and Nicobar islands. There are also rich seaweed beds around Mumbai, Ratnagiri, Goa, Karwar, Varkala, Vizhinjam and Pulicat in Tamil Nadu and Chilka in Orissa.

34. Correct Option: (d)

Explanation:

Hibernation

- ▶ **Statement 3 is correct:** For most animals finding enough food in winter can be difficult when the main source of food like insects or green plants is in short supply. Some animals solve this

problem by hibernating. Hibernation is a deep sleep that helps them to save energy and survive the winter without eating much. Reducing metabolic rate and lowering body temperature enables survival through cold periods when food is scarce or has little energy value. Hibernating species usually work hard to build up large fat reserves before they bed down, and subsist on this during their torpor. They might wake up at intervals to defecate or top up on food.

- ▶ **Statement 1 and 2 are correct:** Hibernation is a state of inactivity, in which an animal's heart rate, body temperature, and breathing rate are decreased in order to conserve energy through the cold months of winter. Electrical activity in the brain almost completely ceases during hibernation, although some areas remain active. These areas are those that respond to external stimuli such as light, temperature, and noise. Thus, the hibernating animal can be aroused under extreme conditions.
- ▶ Some of the hibernating animals include fish, frogs and turtles, which have no way to keep warm during winter. They shelter under logs, rocks and fallen leaves in the water. When the weather gets cold, they move down to the bottom of lakes and ponds and some even burrow into the mud.

35. Correct Option: (b)

Explanation:

- ▶ **Statement 2 is correct:** Birth Rate and Natality Rate -the number of live births per 1000 in a year.
- ▶ Birth rates are affected by such factors as nutrition, fertility, attitudes about abortion, labour value of children, government policies, social value, the availability of contraception and culture.
- ▶ **Statement 3 is incorrect:** Death rate and Mortality Rate-the number of deaths per 1000 in a year. Death rates are affected by disease, war, medical technology, improved health care, transportation development and nutrition.
- ▶ **Statement 4 is correct:** Immigration-the number of people moving into a country.
- ▶ **Pull factors-characteristics of a place that attracts people to it.**
- ▶ **Statement 1 is incorrect:** Emigration-

the number of people leaving a country. Also dispersal from a region leads to reduction in population density.

- ▶ **Push Factors**-characteristics of a place that causes people to leave.
- ▶ **Refugees**- people who are forced to leave their country due to war, life-threatening discrimination, famine, or natural disasters.

36. Correct Option: (a)

Explanation:

Taiga Forest Ecosystem

- ▶ **Statement 1 and 2 are correct:** Taigas are cold-climate forests found in the northern latitudes. Taigas are the world's largest terrestrial ecosystem and account for about 29% of the Earth's forests. The largest taiga ecosystems are found in Canada and Russia.
- ▶ Taigas are known for their sub-arctic climate with extremely cold winters and mild summers. They primarily consist of coniferous trees, such as pines, although there are some other deciduous trees, such as spruce and elm that have adapted to live in these areas that receive little direct sunlight for much of the year.
- ▶ Taigas are home to large herbivores, such as moose, elk, and bison, as well as omnivores, such as bears.
- ▶ **Statement 3 is incorrect:** Taiga soil tends to be young and poor in nutrients. It lacks the deep, organically enriched profile. The thinness of the soil is due largely to the cold, which hinders the development of soil and the ease with which plants can use its nutrients.

37. Correct Option: (a)

Explanation:

Ecosystem Services

- ▶ Ecosystem services are the suite of benefits that ecosystems provide to humanity.
- ▶ **Statement 1 is correct:** Provisioning Services: Provisioning Services are ecosystem services that describe the material or energy outputs from ecosystems. They include food, water and other resources. Food: Ecosystems provide the conditions for growing food.
- ▶ **Statement 2 is incorrect:** Regulating

Services: Regulating services consist of ecosystem processes that maintain environmental conditions favorable to life. The most important of these are the cycling of substances and ensuring of the reproduction of organisms. Some regulating services are less vital, but still beneficial to humans such as the abatement of noise and pollution by trees and plants in cities, carbon sequestration.

- ▶ **Statement 3 is correct:** Cultural Services: Cultural services. The non-material benefits people obtain from ecosystems are called 'cultural services'. They include aesthetic inspiration, cultural identity, sense of home, spiritual experience related to the natural environment, recreational activities.

38. Correct Option: (b)

Explanation:

About Biogeochemical Cycling

- ▶ **Biogeochemical cycle**, any of the natural pathways by which essential elements of living matter are circulated. The term biogeochemical is a contraction that refers to the consideration of the biological, geological, and chemical aspects of each cycle. Elements within biogeochemical cycles flow in various forms from the nonliving (abiotic) components of the biosphere to the living (biotic) components and back. In order for the living components of a major ecosystem (e.g., a lake or a forest) to survive, all the chemical elements that make up living cells must be recycled continuously. Each biogeochemical cycle can be considered as having a reservoir (nutrient) pool—a larger, slow-moving, usually abiotic portion—and an exchange (cycling) pool—a smaller but more-active portion concerned with the rapid exchange between the biotic and abiotic aspects of an ecosystem.
- ▶ **Statement 1 is incorrect:** Only materials flow are represented in these cycles. Energy flow is represented in pyramids.
- ▶ Based on the replacement period, a nutrient cycle is referred to as Perfect or Imperfect cycle.
- ▶ A perfect nutrient cycle is one in which nutrients are replaced as fast as they are utilized. Most gaseous cycles are generally considered as perfect cycles.
- ▶ In contrast sedimentary cycles are considered relatively imperfect, as some

nutrients are lost from the cycle and get locked into sediments and so become unavailable for immediate cycling.

- ▶ Based on the nature of the reservoir, there are two types of cycles namely-
- ▶ **Statement 2 is correct:** Gaseous Cycle—where the reservoir is the atmosphere or the hydrosphere—water cycle, carbon cycle, nitrogen cycle, etc. and
- ▶ **Sedimentary Cycle**—where the reservoir is the earth's crust [elements mostly found in earth's crust]—phosphorous cycle, sulphur cycle, calcium cycle, magnesium cycle etc.
- ▶ **Statement 3 is correct:** Also, in Carbon cycle, the CO₂ is released into the environment after the biodegradation of dead organic matter.

39. Correct Option: (a)

Explanation:

- ▶ Food chain, in ecology, the sequence of transfers of matter and energy in the form of food from organism to organism. Food chains intertwine locally into a food web because most organisms consume more than one type of animal or plant. Plants, which convert solar energy to food by photosynthesis, are the primary food source.
- ▶ **Option (a) is correct:** The food chain consists of four main parts:
- ▶ **The Sun**, which provides the energy for everything on the planet (except organisms living near the hydrothermal vents).
- ▶ **Producers:** these include all green plants. These are also known as autotrophs, since they make their own food. Producers are able to harness the energy of the sun to make food. In the ocean, the producers are the phytoplankton. It is estimated that 500 billion tons of phytoplankton are produced each year.
- ▶ **Consumers:** In short, consumers are every organism that eats something else. They include herbivores (animals that eat plants), carnivores (animals that eat other animals), parasites (animals that live off of other organisms by harming it), and scavengers (animals that eat dead animal carcasses). In the ocean food chain, the zooplankton eat the phytoplankton. These in turn are eaten by larger zooplankton and then by fish.

It is estimated that for the 50 billion tons of zooplankton are produced each year which support 200 million tons of fish. Thus, the oceanic food chain is has a low efficiency, since much energy is lost through the 3 to 6 levels of predatory transfer.

- ▶ **Decomposers:** These are mainly bacteria and fungi that convert dead matter into gases such as carbon and nitrogen to be released back into the air, soil, or water. Fungi, and other organisms that break down dead organic matter are known as saprophytes. Decomposers are necessary since they recycle the nutrients to be used again by producers.
- ▶ Because energy, in the form of heat, is lost at each step, or trophic level, chains do not normally encompass more than four or five trophic levels. People can increase the total food supply by cutting out one step in the food chain: instead of consuming animals that eat cereal grains, the people themselves consume the grains. Because the food chain is made shorter, the total amount of energy available to the final consumers is increased.

40. Correct Option: (c)

Explanation:

About Biotic Potential

- ▶ **Biotic potential** is what urges a population to grow. It is a measure of how well a species can survive, including how well adapted it is to the environment and its rate of reproduction. Some species produce a lot of young very often (while others produce fewer babies less often), but invest a lot of energy raising and protecting them. So, while the biotic potential of a species causes the population to increase, environmental resistance keeps it from increasing relentlessly.
- ▶ **Option (c) is correct:** Environmental resistance factors are all the things that keep a population of organisms from endlessly increasing. They lower the chances for reproduction, affect the health of organisms, and raise the death rate in the population. Environmental resistance factors include factors that are biotic (living) and abiotic (non-living). Biotic factors are things like predation,

parasitism, lack of food, competition with other organisms and disease. Abiotic factors include drought, fire, temperature, and even the wrong amount of sunshine. You can see how all these things, biotic and abiotic, would become an uphill battle to your boulder-pushing.

- ▶ When the population is small, environmental resistance factors are, not as big of a factor. There may be plenty of resources around so the population can keep growing quickly. But, as competition get stiffer and resources start to become limited, population growth starts to slow.

41. Correct Option: (b)

Explanation:

- ▶ **Option (a) is incorrect:** In ecology, a community is a group or association of populations of two or more different species occupying the same geographical area and in a particular time, also known as a biocoenosis.
- ▶ **Option (b) is correct:** Population is a group of individuals of the same species, inhabiting the same area, and functioning as a unit of biotic community in a specific time.
- ▶ **Option (c) is incorrect:** Genus is a generic term used in the classification of living organisms or binomial nomenclature. This term is a taxonomic rank below the family and above the species of the biological organism. In the contexts of botany, genus is a taxonomic group that classifies more than one species of plants that are closely related in characteristics.
- ▶ **Option (d) is incorrect:** Ecophene is the variety of phenotypes (visible physical characteristics or behaviours), from a single genotype (a specific combination of all alleles in a gene), that can be observed in a population within a particular habitat.

42. Correct Option: (b)

Explanation:

Keystone Species

- ▶ A keystone species is a species that plays a critical role in maintaining the structure of an ecological community and whose impact on the community is greater than

would be expected based on its relative abundance or total biomass. Without the keystone species, the ecological community to which it belongs would be greatly altered and many other species would be negatively impacted.

- ▶ Keystone species have *low functional redundancy*. This means that if the species were to disappear from the ecosystem, no other species would be able to fill its ecological niche. The ecosystem would be forced to radically change, allowing new and possibly invasive species to populate the habitat.
- ▶ **Statement 1 is incorrect:** They are not always the largest or most abundant species in an ecosystem. However, almost all examples of keystone species are animals that have a huge influence on food webs. The way these animals influence food webs varies from habitat to habitat.
- ▶ **Statement 2 is correct:** Although predators are common keystone species, they are not the only members of an ecological community that can serve this role. Herbivores too can be keystone species. For example, in the Serengeti, elephants act as keystone species by eating young saplings such as acacia that grow in the vast grasslands. This keeps the savannahs free of trees and prevents it from gradually becoming a woodland. Additionally, by managing the dominant vegetation in the community, elephants ensure that grasses thrive. In turn, a wide variety of other animals benefit such as wildebeests, zebras, and antelopes. Without grasses, populations of mice and shrews would be reduced.

43. Correct Option: (a)

Explanation:

Population

- ▶ Population is a group of organisms usually of the same species, occupying a defined area during a specific time.
- ▶ **Option (a) is correct:** Population growth rate is the percentage variation between the numbers of individuals in a population at two different times. Therefore the population growth rate can be positive or negative. The main factors that make population grow are birth and immigration. The main factors

that make population decrease are death and emigration.

- ▶ The main limiting factors for the population growth are abiotic and biotic compounds.
- ▶ Population density is the relation between the number of individuals of a population and the area they occupy.

44. Correct Option: (c)

Explanation:

Environmental Resistance

- ▶ Environmental Resistance factors are all the things that keep a population of organisms from endlessly increasing. They lower the chances for reproduction, affect the health of organisms, and raise the death rate in the population.
- ▶ **Option (c) is correct:** Environmental resistance factors include factors that are biotic (living) and abiotic (non-living). Biotic factors are things like predation, parasitism, lack of food, competition with other organisms and disease. Abiotic factors include drought, fire, temperature, and even the wrong amount of sunshine. You can see how all these things, biotic and abiotic, would become an uphill battle to your boulder-pushing.

45. Correct Option: (a)

Explanation:

- ▶ **Option (a) is correct:** The foremost implication of addition of fertilizers to the aquatic ecosystems is eutrophication which in turn leads to increased growth of Phytoplanktons and other algae matter. 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.

46. Correct Option: (c)

Explanation:

About Alien Species

- ▶ **Option (c) is correct:** An exotic or alien species is one that has been introduced to a new place, but does not necessarily have negative consequences. For example, many fish species have been introduced into the Great Lakes for sport

fishing.² They have no documented negative impacts and provide recreational opportunities and a food source. However, when these alien species begin to have negative consequences in the new habitat, they are called invasive species. Invasive species may cause environmental harm, economic harm, or impact human health

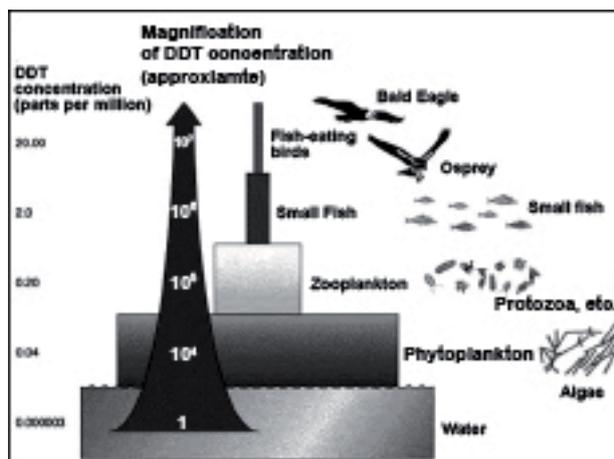
- ▶ Globalization has resulted in greater trade, transport, travel and tourism, all of which can facilitate the introduction and spread of species that are not native to an area. If a new habitat is similar enough to a species' native habitat, it may survive and reproduce. For a species to become invasive, it must successfully out-compete native organisms for food and habitat, spread through its new environment, increase its population and harm ecosystems in its introduced range.

47. Correct Option: (c)

Explanation:

Biomagnification

- ▶ Biomagnification is the accumulation of a chemical contamination by an organism from water and food exposure that results in a concentration that is greater than would have resulted from water exposure only and thus greater than expected from equilibrium. These substances often arise from intoxicated or contaminated environments. The contaminants include heavy metals namely mercury, arsenic, pesticides such as DDT, and polychlorinated biphenyls (PCBs) compounds which are then taken up by organisms because of the food they consume or the intoxication of their environment.
- ▶ **Option (c) is correct:** When organisms in the higher food chain consume the organisms containing the toxins below their trophic levels, the toxins gradually become concentrated in the higher food chain. Because this is a repetitive process in the ecosystem and throughout the entire food chain, the higher organisms are the ones that will accumulate most of the toxins.



48. Correct Option: (a)

Explanation:

Biomes

- ▶ **Option (a) is correct:** There are eight major terrestrial biomes: tropical rainforests, savannahs, subtropical deserts, chaparral, temperate grasslands, temperate forests, boreal forests, and Arctic tundra. Biomes are large-scale environments that are distinguished by characteristic temperature ranges and amounts of precipitation. These two variables affect the types of vegetation and animal life that can exist in those areas. Because each biome is defined by climate, the same biome can occur in geographically distinct areas with similar climates
- ▶ The broad classification of biomes can be established as: tundra, taiga (also called boreal forest), temperate deciduous forest, scrub forest (called chaparral in California), grassland, desert, tropical rain forest and temperate rain forest.

49. Correct Option: (d)

Explanation:

Biomes

- ▶ There are eight major terrestrial biomes: tropical rainforests, savannahs, subtropical deserts, chaparral, temperate grasslands, temperate forests, boreal forests, and Arctic tundra. Biomes are large-scale environments that are distinguished by characteristic temperature ranges and amounts of precipitation. These two variables affect the types of vegetation

and animal life that can exist in those areas. Because each biome is defined by climate, the same biome can occur in geographically distinct areas with similar climates.

- ▶ **Option (a) is incorrect:** The boreal forest, also known as taiga or coniferous forest, is found roughly between 50° and 60° north latitude across most of Canada, Alaska, Russia, and northern Europe. This biome has cold, dry winters and short, cool, wet summers. The annual precipitation is from 30 cm to 70 cm (15.7–39 in) and usually takes the form of snow; relatively little evaporation occurs because of the cool temperatures.
- ▶ **Option (b) is incorrect:** The temperature and sunlight profiles of tropical rainforests are stable in comparison to other terrestrial biomes, with average temperatures ranging from 20°C to 34°C (68°F to 93°F). The annual rainfall in tropical rainforests ranges from 125 to 660 cm (50–200 in) with considerable seasonal variation. Tropical rainforests have wet months in which there can be more than 30 cm (11–12 in) of precipitation, as well as dry months in which there are fewer than 10 cm (3.5 in) of rainfall. However, the driest month of a tropical rainforest can still exceed the annual rainfall of some other biomes, such as deserts.
- ▶ **Option (c) is incorrect:** Temperate grasslands have pronounced annual fluctuations in temperature with hot summers and cold winters. The annual temperature variation produces specific growing seasons for plants. Annual precipitation ranges from 25.4 cm to 88.9 cm (10–35 in). Temperate grasslands have few trees except for those found growing along rivers or streams. The dominant vegetation tends to consist of grasses.
- ▶ **Option (d) is correct:** The chaparral is also called scrub forest and is found in California, along the Mediterranean Sea, and along the southern coast of Australia. The annual rainfall in this biome ranges from 65 cm to 75 cm (25.6–29.5 in) and the majority of the rain falls in the winter. Summers are very dry and many chaparral plants are dormant during the summertime. The chaparral vegetation is dominated by shrubs and

is adapted to periodic fires, with some plants producing seeds that germinate only after a hot fire.

50. Correct Option: (d)

Explanation:

Biotic Components

- ▶ **Option (d) is correct:** Biotic component of ecosystem consist of living components. The different biotic components are connected through food and a number of other relations. The following three main types are :
 - ▶ **Producers:** Autotrophic organisms are called producers. They are green plants and certain bacteria. They are capable of synthesizing organic food from inorganic raw materials with the help of solar energy. They provide food, shelter and oxygen to the living organisms. Some of the examples of producer are herbs, shrubs, grasses, phytoplanktons and trees.
 - ▶ **Consumers:** They are animals that feeds on other organisms. They are also called heterotrophs. They are divided into two types, herbivorous and carnivorous. Herbivores obtain their food directly from green plants or producers. So, they are also known as primary consumer. For examples, deer feed on grass. Here, deer is a primary consumer and grass is a producer. Carnivores feed on herbivores. For example, jackal feed on herbivorous animals like deer, goat etc. Here, jackal is a primary carnivorous or secondary consumer. Here again, these secondary consumers are eaten by top consumers like lion, tiger etc. This are known as top consumers because they are not eaten by other animals.
 - ▶ **Decomposers:** They feed on dead bodies of organisms and organic wastes of living organisms. They absorb some of the product while release most of the inorganic compounds into environment. These inorganic compounds are used by the producers to produce food. Some of the examples of decomposers are maggots, bacteria, slugs, etc.