

## CUET MCQ Questions with Solutions from UNIT 5 (2)

### 1. What is ecological succession?

- A. Replacement of animal species over time.
- B. Gradual and predictable change in the composition of species in an area.
- C. Random distribution of species in an area.
- D. Permanent loss of species in a habitat.

**Answer: B**

**Solution:** Ecological succession refers to the gradual and predictable process by which ecosystems develop and mature over time, replacing one biological community with another until reaching stability.

### 2. Primary succession occurs in areas:

- A. Previously occupied by living organisms.
- B. Without any previous soil or life, like bare rock.
- C. Destroyed by human activity.
- D. Occupied only by plants.

**Answer: B**

**Solution:** Primary succession begins in lifeless areas without soil, such as newly formed volcanic rocks, where pioneer species like lichens initiate soil formation.

### 3. Secondary succession occurs:

- A. In areas devoid of soil.
- B. On previously inhabited areas after disturbances like fire or flood.
- C. Only in aquatic ecosystems.
- D. In areas with pioneer species.

**Answer: B**

**Solution:** Secondary succession takes place in areas where an existing ecosystem has been disrupted, but the soil remains intact, allowing faster regeneration of life.

### 4. What are pioneer species?

- A. Species that dominate climax communities.
- B. First species to colonize barren environments.
- C. Animal species that follow plants in succession.
- D. Invasive species in an ecosystem.

**Answer: B**

**Solution:** Pioneer species like mosses and lichens are the first to colonize barren or disturbed ecosystems, preparing the area for other species by contributing to soil formation.

**5. A climax community is:**

- A. A temporary stage in succession.
- B. The stable, final stage of succession.
- C. Dominated by pioneer species.
- D. The starting point of primary succession.

**Answer: B**

**Solution:** A climax community is the stable and mature ecosystem that develops at the end of ecological succession, characterized by equilibrium between species and the environment.

**6. Carbon fixation occurs during:**

- A. Photosynthesis
- B. Respiration
- C. Decomposition
- D. Combustion

**Answer: A**

**Solution:** Carbon fixation is the process by which plants and other autotrophs convert atmospheric CO<sub>2</sub> into organic compounds during photosynthesis.

**7. Pollination is essential because it:**

- A. Provides oxygen to the atmosphere.
- B. Facilitates seed and fruit production in plants.
- C. Helps in nutrient cycling.
- D. Converts CO<sub>2</sub> to glucose.

**Answer: B**

**Solution:** Pollination is a crucial ecological service where pollinators like bees and butterflies transfer pollen, enabling plants to produce seeds and fruits essential for reproduction.

**8. What is the primary source of oxygen released into the atmosphere?**

- A. Decomposers
- B. Photosynthesis in plants
- C. Respiration in animals
- D. Combustion of fossil fuels

**Answer: B**

**Solution:** Photosynthesis in plants releases oxygen as a by-product when water is split to generate energy for converting CO<sub>2</sub> into glucose.

**9. Why is carbon fixation important for ecosystems?**

- A. It removes oxygen from the atmosphere.
- B. It provides the basis for the food chain.
- C. It accelerates decomposition.
- D. It eliminates greenhouse gases.

**Answer: B**

**Solution:** Carbon fixation transforms CO<sub>2</sub> into glucose, forming the basis of the food chain and providing energy to sustain ecosystems.

**10. What role do decomposers play in succession?**

- A. Consuming primary producers.
- B. Recycling nutrients back into the ecosystem.
- C. Limiting population growth.
- D. Producing oxygen.

**Answer: B**

**Solution:** Decomposers break down organic matter, releasing nutrients back into the soil, which supports plant growth and contributes to ecosystem development.

**11. In ecological succession, nitrogen-fixing bacteria are crucial because:**

- A. They prevent soil erosion.
- B. They enrich soil by converting atmospheric nitrogen into usable forms.
- C. They promote oxygen release.
- D. They act as decomposers.

**Answer: B**

**Solution:** Nitrogen-fixing bacteria like Rhizobium convert atmospheric nitrogen into forms like ammonia, enhancing soil fertility during succession.

**12. How does energy flow in an ecosystem during succession?**

- A. Randomly between organisms.
- B. From producers to consumers in a unidirectional manner.
- C. From decomposers to herbivores.
- D. Cyclically between all organisms.

**Answer: B**

**Solution:** Energy flows unidirectionally from producers (plants) to primary consumers (herbivores) and then to higher trophic levels, with energy lost as heat at each level.

**13. A keystone species:**

- A. Always dominates numerically.
- B. Has a disproportionately large effect on its ecosystem.

- C. Is always a primary consumer.
- D. Initiates primary succession.

**Answer: B**

**Solution:** Keystone species have a significant impact on ecosystem structure and function, influencing the composition and stability of communities.

**14. Secondary succession is faster than primary succession because:**

- A. Soil is already present.
- B. The climate is more favorable.
- C. Pioneer species are not needed.
- D. It occurs in aquatic ecosystems.

**Answer: A**

**Solution:** Secondary succession occurs more rapidly as the soil remains intact after a disturbance, providing a foundation for new growth.

**15. Bees contribute to ecological services by:**

- A. Fixing nitrogen in the soil.
- B. Decomposing organic matter.
- C. Pollinating flowers, aiding plant reproduction.
- D. Recycling carbon.

**Answer: C**

**Solution:** Bees are vital pollinators, transferring pollen between flowers, which facilitates seed production and supports plant reproduction.

**16. Biodiversity refers to:**

- A. The total number of individuals in an ecosystem.
- B. The variety of all forms of life on Earth.
- C. Only the plant species in a forest.
- D. The number of organisms in an ecosystem.

**Answer: B**

**Solution:** Biodiversity encompasses the variety of all life forms on Earth, including plants, animals, fungi, and microorganisms, along with the ecosystems they form and the genetic diversity within them.

**17. Biodiversity is highest in which region?**

- A. Temperate regions
- B. Polar regions
- C. Tropical rainforests
- D. Deserts

**Answer: C**

**Solution:** Tropical rainforests exhibit the highest biodiversity due to their stable climate, abundant resources, and long evolutionary history, which supports a vast number of species.

**18. Biodiversity is crucial because it:**

- A. Increases the number of predators.
- B. Supports ecosystem services and human survival.
- C. Reduces genetic variation.
- D. Eliminates competition in ecosystems.

**Answer: B**

**Solution:** Biodiversity ensures the stability and functioning of ecosystems, providing essential services like food, oxygen production, pollination, and climate regulation, which are vital for human survival.

**19. Biodiversity hotspots are regions:**

- A. With low species diversity.
- B. With high species richness and endemism.
- C. Primarily located in polar regions.
- D. That lack endangered species.

**Answer: B**

**Solution:** Biodiversity hotspots are regions with exceptional levels of species richness and a high number of endemic species, often under significant threat from human activities.

**20. The primary cause of biodiversity loss is:**

- A. Natural disasters
- B. Habitat destruction due to human activities
- C. Genetic mutations
- D. Soil erosion

**Answer: B**

**Solution:** Habitat destruction caused by deforestation, urbanization, and agriculture is the leading cause of biodiversity loss, as it eliminates the natural homes of countless species.

**21. An endangered species is:**

- A. A species with a stable population.
- B. At high risk of extinction.
- C. Commonly found worldwide.
- D. Increasing in population.

**Answer: B**

**Solution:** Endangered species face a high risk of extinction due to habitat loss, climate change, overexploitation, and other threats.

**22. The Red Data Book is published by:**

- A. UNEP
- B. IUCN
- C. WWF
- D. UNESCO

**Answer: B**

**Solution:** The International Union for Conservation of Nature (IUCN) publishes the Red Data Book, which lists species at risk of extinction globally, categorized as vulnerable, endangered, or critically endangered.

**23. An example of in-situ conservation is:**

- A. Zoos
- B. Gene banks
- C. National parks
- D. Seed banks

**Answer: C**

**Solution:** In-situ conservation involves protecting species in their natural habitats, such as in national parks, wildlife sanctuaries, and biosphere reserves.

**24. Ex-situ conservation includes:**

- A. National parks
- B. Sacred groves
- C. Botanical gardens
- D. Biosphere reserves

**Answer: C**

**Solution:** Ex-situ conservation refers to conserving species outside their natural habitats, like in botanical gardens, zoos, and seed banks.

**25. Biosphere reserves aim to:**

- A. Protect only endangered species.
- B. Combine biodiversity conservation with sustainable development.
- C. Focus only on genetic diversity.
- D. Replace natural ecosystems with artificial ones.

**Answer: B**

**Solution:** Biosphere reserves integrate biodiversity conservation with sustainable resource use, promoting harmony between human activity and nature.

**26. National parks primarily protect:**

- A. Endangered plants only.
- B. Entire ecosystems.
- C. Specific animal species.
- D. Non-renewable resources.

**Answer: B**

**Solution:** National parks conserve entire ecosystems, including flora, fauna, and their habitats, ensuring ecological balance and biodiversity protection.

**27. Sacred groves are significant because:**

- A. They are sites for industrial development.
- B. They protect forests through cultural and religious practices.
- C. They eliminate invasive species.
- D. They reduce pollution levels.

**Answer: B**

**Solution:** Sacred groves are forested areas protected by local communities due to religious and cultural beliefs, serving as reservoirs of biodiversity.

**28. Extinction refers to:**

- A. Migration of species.
- B. Loss of a species forever.
- C. Natural increase in population.
- D. Gradual evolution of species.

**Answer: B**

**Solution:** Extinction is the permanent loss of a species, often due to habitat destruction, overexploitation, climate change, or competition.

**29. Genetic diversity refers to:**

- A. Variety of ecosystems.
- B. Variability within a species.
- C. Total number of species.
- D. Number of endemic species.

**Answer: B**

**Solution:** Genetic diversity is the variation in genes within a species, providing the adaptability and resilience necessary for survival in changing environments.

**30. Habitat loss affects biodiversity by:**

- A. Increasing species richness.
- B. Decreasing the available resources for species survival.
- C. Promoting invasive species.

D. Stabilizing the ecosystem.

**Answer: B**

**Solution:** Habitat loss eliminates the natural homes of species, reducing the availability of resources and leading to population declines and biodiversity loss.

**31. Which of the following is a primary air pollutant?**

A. Ozone

B. Sulfur dioxide

C. Smog

D. Acid rain

**Answer: B**

**Solution:** Sulfur dioxide (SO<sub>2</sub>) is a primary air pollutant emitted directly from sources like factories and vehicles. In contrast, ozone, smog, and acid rain are secondary pollutants formed from primary pollutants in the atmosphere.

**32. Eutrophication in water bodies is caused by:**

A. Heavy metals

B. Excess nutrients like nitrogen and phosphorus

C. Plastic waste

D. Thermal pollution

**Answer: B**

**Solution:** Eutrophication results from the over-enrichment of water bodies with nutrients such as nitrogen and phosphorus, often from agricultural runoff, leading to excessive algal growth and oxygen depletion.

**33. Excessive use of agrochemicals leads to:**

A. Improved soil health

B. Groundwater contamination

C. Increased biodiversity

D. Reduced crop yield

**Answer: B**

**Solution:** Overuse of agrochemicals like pesticides and fertilizers contaminates groundwater, harms aquatic ecosystems, and can affect human health through bioaccumulation.

**34. The best method for solid waste management is:**

A. Landfilling

B. Recycling

C. Incineration

D. Open dumping

**Answer: B**

**Solution:** Recycling reduces the environmental impact by reusing materials, conserving resources, and minimizing waste sent to landfills or incinerators.

**35. Acid rain is primarily caused by:**

A. Carbon dioxide and methane emissions

B. Nitrogen oxides (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>)

C. Volatile organic compounds (VOCs)

D. Particulate matter

**Answer: B**

**Solution:** Acid rain forms when nitrogen oxides (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>) react with water vapor in the atmosphere to produce acidic compounds.

**36. Biodegradable waste includes:**

A. Plastics

B. Food scraps

C. Glass

D. Metal cans

**Answer: B**

**Solution:** Biodegradable waste, such as food scraps and organic matter, can decompose naturally, unlike non-biodegradable items like plastics, glass, and metals.

**37. The greenhouse effect is caused by:**

A. Particulate matter

B. Greenhouse gases trapping heat

C. Depletion of the ozone layer

D. Increased rainfall

**Answer: B**

**Solution:** The greenhouse effect occurs when gases like CO<sub>2</sub>, methane, and water vapor trap heat in the Earth's atmosphere, leading to global warming.

**38. Photochemical smog is mainly caused by:**

A. Heavy rainfall

B. Interaction of sunlight with pollutants like NO<sub>x</sub> and VOCs

C. Soil erosion

D. Ozone layer depletion

**Answer: B**

**Solution:** Photochemical smog forms when sunlight reacts with nitrogen

oxides (NO<sub>x</sub>) and volatile organic compounds (VOCs), producing harmful ground-level ozone.

**39. Bioaccumulation refers to:**

- A. Growth of plants in polluted soil
- B. Accumulation of pollutants in an organism over time
- C. Recycling of solid waste
- D. Decomposition of organic matter

**Answer: B**

**Solution:** Bioaccumulation is the buildup of toxic substances, such as pesticides or heavy metals, in an organism's tissues over time, often through the food chain.

**40. A major source of noise pollution in urban areas is:**

- A. Lightning storms
- B. Vehicular traffic
- C. Photosynthesis
- D. Soil erosion

**Answer: B**

**Solution:** Vehicular traffic is a leading cause of noise pollution in cities, affecting human health by causing stress, hearing loss, and sleep disturbances.

**41. Composting is a method to manage:**

- A. Electronic waste
- B. Organic waste
- C. Plastic waste
- D. Radioactive waste

**Answer: B**

**Solution:** Composting is an eco-friendly method of recycling organic waste, such as food scraps and yard waste, into nutrient-rich compost for soil.

**42. Carbon footprint refers to:**

- A. The amount of water used by a person
- B. Total greenhouse gases emitted by an individual or organization
- C. Soil erosion in an area
- D. Noise levels in a city

**Answer: B**

**Solution:** A carbon footprint is the total amount of greenhouse gases released into the atmosphere due to activities like transportation, energy use, and consumption.

**43. Water treatment plants remove:**

- A. Only organic pollutants
- B. Both organic and inorganic pollutants
- C. Noise from water sources
- D. Nutrients like nitrogen and phosphorus

**Answer: B**

**Solution:** Water treatment plants purify water by removing both organic (like pathogens) and inorganic (like heavy metals) contaminants, ensuring safe drinking water.

**44. Persistent use of pesticides leads to:**

- A. Enhanced soil fertility
- B. Pest resistance
- C. Reduced crop yield
- D. Increased water availability

**Answer: B**

**Solution:** Prolonged pesticide use can cause pests to develop resistance, making the chemicals less effective and necessitating stronger or more frequent applications.

**45. Thermal pollution is caused by:**

- A. Increased use of fertilizers
- B. Discharge of heated water from industrial plants
- C. Plastic waste in oceans
- D. Oil spills in rivers

**Answer: B**

**Solution:** Thermal pollution occurs when industries discharge heated water into water bodies, raising temperatures and disrupting aquatic ecosystems.

**46. The harmful pollutants in agrochemicals are:**

- A. Pesticides and herbicides
- B. Carbon dioxide and methane
- C. Sulfur dioxide and nitrogen oxides
- D. Volcanic ash

**Answer: A**

**Solution:** Agrochemicals such as pesticides and herbicides contain harmful substances that can contaminate soil and water, affecting ecosystems and human health.

**47. Sanitary landfills differ from open dumps because:**

- A. They use incinerators
- B. They prevent leachate from contaminating groundwater
- C. They are only for biodegradable waste
- D. They eliminate all waste

**Answer: B**

**Solution:** Sanitary landfills are engineered to contain waste securely and prevent leachate from polluting groundwater, unlike open dumps.

**48. Renewable energy sources help reduce:**

- A. Water pollution
- B. Air pollution caused by fossil fuels
- C. Soil erosion
- D. Noise pollution

**Answer: B**

**Solution:** Renewable energy sources like solar and wind power reduce air pollution by replacing fossil fuel combustion, which releases harmful gases.

**49. Bioremediation refers to the use of:**

- A. Chemical agents to remove waste
- B. Microorganisms to clean up environmental pollutants
- C. Advanced technology to treat water pollution
- D. Landfilling to manage solid waste

**Answer: B**

**Solution:** Bioremediation is an eco-friendly technique where microorganisms, such as bacteria and fungi, are used to break down and remove environmental pollutants.

**50. A major consequence of deforestation is:**

- A. Improved air quality
- B. Loss of biodiversity
- C. Reduced soil fertility
- D. Increased water levels

**Answer: B**

**Solution:** Deforestation destroys habitats, leading to a significant loss of biodiversity and disrupting ecological balance.

## CUET MCQ Questions with Solutions from UNIT 5

### 1. What is the primary difference between habitat and niche?

- A. Habitat is where an organism lives, and niche is its role.
- B. Habitat includes only abiotic factors.
- C. Niche is physical space only.
- D. Habitat and niche are identical.

**Answer: A**

**Solution:** Habitat is the physical location where an organism resides, while a niche encompasses its functional role, including interactions with other species and the environment.

### 2. Which of the following best defines a niche?

- A. The physical space occupied by an organism.
- B. The role and position of a species in its ecosystem.
- C. The food resources available to an organism.
- D. The mating behavior of an organism.

**Answer: B**

**Solution:** A niche includes all the physical, chemical, and biological factors that a species interacts with, as well as its role in the ecosystem.

### 3. Which statement is true about habitat?

- A. It only includes biotic factors.
- B. It varies with seasons.
- C. It cannot overlap for different species.
- D. It is only relevant for terrestrial organisms.

**Answer: B**

**Solution:** Habitat can change based on seasonal variations, such as animals migrating to warmer areas during winter or plants adapting to seasonal rainfall.

### 4. Which example best illustrates an organism's niche?

- A. A deer drinking water from a river.
- B. A fox preying on rodents in a forest.
- C. A tree growing in a forest.
- D. A bird building a nest.

**Answer: B**

**Solution:** A fox preying on rodents highlights its ecological role in controlling the rodent population, which is part of its niche.

**5. What determines the carrying capacity of a habitat?**

- A. Availability of sunlight.
- B. Resources like food, water, and space.
- C. Reproductive rate of the species.
- D. Interaction with predators.

**Answer: B**

**Solution:** Carrying capacity is defined by the availability of essential resources that sustain a population without degrading the habitat.

**6. What is an example of physiological adaptation?**

- A. Camouflage in chameleons.
- B. Hibernation in bears.
- C. Migration of birds.
- D. Thick fur in polar bears.

**Answer: B**

**Solution:** Physiological adaptations are internal processes like hibernation, which allows bears to conserve energy during scarce food availability.

**7. Structural adaptations in organisms refer to:**

- A. Changes in body structure to survive.
- B. Changes in behavior for survival.
- C. Seasonal migration to suitable habitats.
- D. Changes in population density.

**Answer: A**

**Solution:** Structural adaptations are physical traits like thick fur in polar bears that help them survive extreme cold environments.

**8. Which of the following is NOT an adaptation?**

- A. Long roots in desert plants.
- B. Migration of fish upstream.
- C. Overpopulation in a specific region.
- D. Camouflage in insects.

**Answer: C**

**Solution:** Overpopulation is a demographic phenomenon, not an adaptation aimed at survival or reproduction.

**9. Behavioral adaptation involves:**

- A. Formation of spines in plants.
- B. Living in groups for protection.
- C. Thick cuticle on leaves.

D. Growth of taproots.

**Answer: B**

**Solution:** Behavioral adaptations include actions like group living for mutual defense, which improves survival chances.

**10. Which adaptation is seen in desert plants?**

A. Large leaves for transpiration.

B. Reduced leaves or spines.

C. Absence of roots.

D. Thin cuticle on leaves.

**Answer: B**

**Solution:** Desert plants minimize water loss through adaptations like reduced leaves or spines and thick cuticles.

**11. Mutualism benefits:**

A. Only one species.

B. Both interacting species.

C. Neither species.

D. Predator species only.

**Answer: B**

**Solution:** Mutualism is a relationship where both species benefit, such as pollinators and flowering plants.

**12. Predation involves:**

A. Two species living together without harming each other.

B. One species feeding on another.

C. Both species benefiting from interaction.

D. Competition for the same resource.

**Answer: B**

**Solution:** Predation is an interaction where one species (predator) kills and eats another (prey), such as lions hunting deer.

**13. Parasitism is defined as:**

A. Symbiotic interaction that harms one species.

B. Beneficial interaction for both species.

C. Competition for the same food.

D. Co-existence without any interaction.

**Answer: A**

**Solution:** Parasitism harms the host while benefiting the parasite, like tapeworms in the intestines of humans.

**14. Which is NOT an example of mutualism?**

- A. Bees and flowering plants.
- B. Coral and zooxanthellae algae.
- C. Cattle egrets and cattle.
- D. Human gut bacteria producing vitamins.

**Answer: C**

**Solution:** Cattle egrets feed on insects stirred up by cattle but do not help the cattle, making it commensalism, not mutualism.

**15. Competition occurs when:**

- A. Two species live together peacefully.
- B. Two species use the same limited resource.
- C. One species benefits at the other's expense.
- D. Both species benefit from the interaction.

**Answer: B**

**Solution:** Competition arises when species compete for a limited resource, such as food, water, or shelter.

**16. Which term describes population growth under ideal conditions?**

- A. Logistic growth
- B. Exponential growth
- C. Declining growth
- D. Saturation growth

**Answer: B**

**Solution:** Exponential growth occurs when resources are abundant, leading to rapid and unchecked population increase.

**17. Birth rate is defined as:**

- A. Number of deaths per unit time.
- B. Number of births per unit time.
- C. Ratio of births to deaths.
- D. Growth of a population over time.

**Answer: B**

**Solution:** Birth rate refers to the number of live births per unit time in a population.

**18. What does age distribution indicate in a population?**

- A. Proportion of individuals in different age groups.
- B. Total population density.

- C. Migration rates.
- D. Food availability in an ecosystem.

**Answer: A**

**Solution:** Age distribution provides insights into the population structure, such as the proportion of juveniles, adults, and seniors.

**19. Carrying capacity is:**

- A. Maximum population an ecosystem can support sustainably.
- B. Total population size at a given time.
- C. Maximum birth rate in a population.
- D. Amount of food in an ecosystem.

**Answer: A**

**Solution:** Carrying capacity is the maximum sustainable population size based on available resources and environmental conditions.

**20. Which factor does NOT directly affect population growth?**

- A. Birth rate
- B. Death rate
- C. Immigration
- D. Seasonal changes

**Answer: D**

**Solution:** Seasonal changes affect behavior and distribution but do not directly contribute to population size changes.

**21. What role do predators play in an ecosystem?**

- A. They disrupt food chains.
- B. They increase the prey population.
- C. They regulate prey populations and promote biodiversity.
- D. They consume only plants.

**Answer: C**

**Solution:** Predators help maintain ecological balance by controlling prey populations, which prevents overgrazing or depletion of resources. This balance promotes biodiversity and ecosystem health by allowing other species to thrive.

**22. How does logistic growth differ from exponential growth?**

- A. Logistic growth occurs under ideal conditions.
- B. Logistic growth considers carrying capacity, while exponential growth does not.
- C. Logistic growth is faster than exponential growth.

D. Logistic growth does not involve resources.

**Answer: B**

**Solution:** Exponential growth is rapid and unrestricted, occurring under ideal conditions. Logistic growth accounts for environmental limitations and carrying capacity, slowing as resources become scarce and the population reaches equilibrium.

**23. How do ecological adaptations contribute to evolution?**

A. By eliminating competition.

B. By enhancing survival and reproduction in specific environments.

C. By decreasing genetic diversity.

D. By increasing population density.

**Answer: B**

**Solution:** Ecological adaptations enable organisms to survive and reproduce in their environments, passing on advantageous traits. Over time, these adaptations drive natural selection and evolutionary changes, shaping species to fit their habitats better.

**24. Which factor primarily affects the carrying capacity of an ecosystem?**

A. Climate alone.

B. The reproductive rate of species.

C. Availability of resources like food, water, and space.

D. Immigration and emigration only.

**Answer: C**

**Solution:** Carrying capacity depends on resource availability, including food, water, and shelter. Limited resources constrain population growth, ensuring that an ecosystem can only support a specific number of individuals sustainably.

**25. What is the relationship between fungi and algae in lichens?**

A. Predation

B. Competition

C. Mutualism

D. Parasitism

**Answer: C**

**Solution:** In lichens, fungi provide structure and water retention, while algae or cyanobacteria produce food through photosynthesis. This mutualistic relationship benefits both organisms, allowing them to survive in harsh environments and contributing to ecological interactions

**26. Which of the following best defines an ecosystem?**

- A. A community of organisms and their physical environment interacting as a unit.
- B. Only abiotic factors in a given area.
- C. A group of similar species living together.
- D. Only the producers in a habitat.

**Answer: A**

**Solution:** An ecosystem is a functional unit where living organisms (biotic) interact with non-living elements (abiotic) like soil, water, and air to form a self-sustaining system.

**27. What is Gross Primary Productivity (GPP)?**

- A. Total energy used by consumers.
- B. Total energy fixed by plants through photosynthesis.
- C. Energy available to herbivores.
- D. Energy lost as heat in respiration.

**Answer: B**

**Solution:** GPP is the total amount of energy captured by plants during photosynthesis. It represents the initial input of energy into the ecosystem before any losses due to respiration.

**28. What is the final product of decomposition?**

- A. Organic material
- B. Humus and inorganic nutrients
- C. Biomass
- D. Energy

**Answer: B**

**Solution:** Decomposition breaks down organic matter into humus (partially decomposed organic matter) and releases inorganic nutrients like nitrogen, phosphorus, and potassium into the soil, enriching it.

**29. Energy flow in an ecosystem is:**

- A. Circular
- B. Bi-directional
- C. Unidirectional
- D. Static

**Answer: C**

**Solution:** Energy flow in an ecosystem is unidirectional. It moves from the sun to producers (plants) and then to consumers (herbivores, carnivores), with energy lost as heat at each trophic level.

**30. The Pyramid of Energy is always:**

- A. Upright
- B. Inverted
- C. Horizontal
- D. Irregular

**Answer: A**

**Solution:** The Pyramid of Energy is always upright because energy decreases as it moves from producers to higher trophic levels, with losses at each step due to respiration and heat dissipation.

**31. Which organism is a primary consumer?**

- A. Grasshopper
- B. Eagle
- C. Fungi
- D. Oak tree

**Answer: A**

**Solution:** Primary consumers are herbivores that feed on producers. Grasshoppers eat plants, making them primary consumers in the ecosystem.

**32. Which process removes carbon dioxide from the atmosphere?**

- A. Respiration
- B. Combustion
- C. Photosynthesis
- D. Decomposition

**Answer: C**

**Solution:** Photosynthesis removes CO<sub>2</sub> from the atmosphere as plants convert it into glucose. This process is vital in maintaining the balance of carbon in the atmosphere.

**33. Phosphorus is mostly stored in:**

- A. Atmosphere
- B. Rocks and sediments
- C. Ocean water
- D. Living organisms

**Answer: B**

**Solution:** Phosphorus is primarily stored in rocks and sediments. Weathering releases phosphate ions, which enter soil and water, becoming available to plants and animals.

**34. What does secondary productivity measure?**

- A. Energy flow in autotrophs
- B. Energy stored in consumers
- C. Total energy fixed by plants
- D. Heat loss in the environment

**Answer: B**

**Solution:** Secondary productivity refers to the rate at which consumers convert assimilated food into biomass. It indicates energy transfer efficiency at consumer levels.

**35. The pyramid of biomass is inverted in:**

- A. Forest ecosystems
- B. Grasslands
- C. Aquatic ecosystems
- D. Tundra ecosystems

**Answer: C**

**Solution:** In aquatic ecosystems, the pyramid of biomass can be inverted because producers like phytoplankton have a small biomass but reproduce rapidly to support a larger biomass of consumers.

**36. Nutrient cycling ensures:**

- A. Flow of energy in ecosystems
- B. Constant availability of essential elements
- C. Growth of producers only
- D. Biodiversity reduction

**Answer: B**

**Solution:** Nutrient cycling maintains a balance of essential nutrients like nitrogen, carbon, and phosphorus by continuously recycling them between biotic and abiotic components.

**37. Which of the following begins the detritus food chain?**

- A. Producers
- B. Primary consumers
- C. Decomposers
- D. Secondary consumers

**Answer: C**

**Solution:** The detritus food chain starts with decomposers, such as fungi and bacteria, breaking down dead organic matter and recycling nutrients back into the ecosystem.

**38. A limiting nutrient in an ecosystem is:**

- A. Always abundant
- B. Present in a smaller quantity relative to demand
- C. Completely absent
- D. Unavailable for uptake by plants

**Answer: B**

**Solution:** Limiting nutrients, like phosphorus or nitrogen, are present in quantities insufficient to meet ecosystem demands, thereby restricting growth or productivity.

**39. Which factor limits primary productivity in oceans?**

- A. Light and nutrients
- B. Temperature
- C. Salinity
- D. pH

**Answer: A**

**Solution:** Primary productivity in oceans is often limited by the availability of light (needed for photosynthesis) and nutrients like nitrogen and phosphorus, which are scarce in deeper waters.

**40. Accumulation of litter in an ecosystem indicates:**

- A. Low decomposition rate
- B. High productivity
- C. Rapid nutrient cycling
- D. Overabundance of detritivores

**Answer: A**

**Solution:** Litter accumulation occurs when the decomposition rate is slow, often due to unfavorable conditions like low temperatures or lack of decomposers.

**41. What are the two main components of an ecosystem?**

- A. Producers and decomposers
- B. Biotic and abiotic components
- C. Flora and fauna
- D. Nutrient cycles and energy flow

**Answer: B**

**Solution:** Ecosystems consist of biotic components (living organisms like plants, animals, and microorganisms) and abiotic components (non-living factors such as soil, water, temperature, and sunlight). Both components interact to sustain ecological processes and support life.

**42. What does primary productivity in an ecosystem refer to?**

- A. The decomposition rate of organic matter.
- B. The rate of energy storage by autotrophs.
- C. The flow of energy between trophic levels.
- D. The population of consumers in an ecosystem.

**Answer: B**

**Solution:** Primary productivity refers to the rate at which autotrophs (producers like plants) convert solar energy into chemical energy through photosynthesis. It includes gross primary productivity (total energy produced) and net primary productivity (energy remaining after respiration).

**43. Which process is a key step in decomposition?**

- A. Photosynthesis
- B. Fragmentation of organic matter
- C. Pollination
- D. Nitrification

**Answer: B**

**Solution:** Decomposition involves breaking down dead organic material into simpler substances. Fragmentation is the initial step where detritivores like earthworms break organic matter into smaller pieces, facilitating further chemical decomposition by microbes.

**44. How does energy flow in an ecosystem?**

- A. In a circular pattern.
- B. From decomposers to producers.
- C. In a unidirectional flow from producers to consumers.
- D. By recycling between all components.

**Answer: C**

**Solution:** Energy flows in a unidirectional manner in ecosystems, beginning with producers that capture sunlight. This energy is transferred to primary consumers (herbivores) and then to higher-level consumers, with energy loss at each trophic level as heat.

**45. Which ecological pyramid can never be inverted?**

- A. Pyramid of number
- B. Pyramid of biomass
- C. Pyramid of energy
- D. All of the above

**Answer: C**

**Solution:** The pyramid of energy always remains upright because energy

decreases as it flows from one trophic level to the next due to energy loss as heat during metabolic processes. Energy flow follows the second law of thermodynamics.

**46. Which process contributes to carbon release into the atmosphere?**

- A. Photosynthesis
- B. Decomposition of organic matter
- C. Absorption by oceans
- D. Nutrient cycling in plants

**Answer: B**

**Solution:** Decomposition releases carbon dioxide (CO<sub>2</sub>) into the atmosphere as microbes break down dead organic matter. This process is part of the carbon cycle, balancing carbon input and output in ecosystems.

**47. Why is the phosphorus cycle considered a sedimentary cycle?**

- A. Phosphorus is found in the atmosphere.
- B. Phosphorus primarily cycles through soil and rock.
- C. It involves gaseous exchanges.
- D. It includes oceanic currents.

**Answer: B**

**Solution:** The phosphorus cycle is sedimentary because it lacks a gaseous phase. Phosphorus primarily moves through soil, rock, and water systems, with plants absorbing it as phosphates and passing it through food chains.

**48. Which aquatic ecosystem has the highest productivity?**

- A. Open Ocean
- B. Coral reefs
- C. Deep-sea trenches
- D. Arctic waters

**Answer: B**

**Solution:** Coral reefs have the highest productivity among aquatic ecosystems due to the abundance of sunlight and nutrients, supporting diverse and dense populations of marine organisms.

**49. In a terrestrial ecosystem, the base of the pyramid of biomass is occupied by:**

- A. Secondary consumers
- B. Producers
- C. Decomposers
- D. Primary consumers

**Answer: B**

**Solution:** Producers, such as plants, form the base of the biomass pyramid in terrestrial ecosystems. They convert solar energy into biomass through photosynthesis, serving as the foundation for higher trophic levels.

**50. What is the primary role of nutrient cycling in ecosystems?**

- A. To maintain biodiversity.
- B. To recycle essential elements like carbon and phosphorus.
- C. To increase energy flow.
- D. To prevent decomposition.

**Answer: B**

**Solution:** Nutrient cycling ensures the continuous availability of essential elements like carbon and phosphorus by recycling them through biotic and abiotic components of ecosystems, sustaining life and ecosystem functioning.