Q1. Which of the following is not a functional component of an ecosystem?

A. Productivity
B. Stratification
C. Energy flow
D. Nutrient cycling

Answer: B. Stratification
Explanation: Stratification is a structural component. Functional components include productivity, energy flow, and nutrient cycling.

Q2. Which of the following ecosystems has the highest net primary productivity (NPP)?

A. Tropical rainforests
B. Deserts
C. Oceans
D. Grasslands

Answer: A. Tropical rainforests
Explanation: Tropical rainforests have high temperature, rainfall, and biodiversity, making them most productive.

Q3. Primary productivity is highest in which zone of aquatic ecosystems?

A. Aphotic zone
B. Abyssal zone
C. Photic zone
D. Benthic zone

Answer: C. Photic zone
Explanation: Photic zone receives sunlight, allowing photosynthesis and high productivity.

Q4. Which of the following correctly represents energy flow in an ecosystem?

A. Cyclic and reversible
B. Unidirectional and cyclic
C. Cyclic and non-sequential
D. Unidirectional and non-cyclic

Answer: D. Unidirectional and non-cyclic
Explanation: Energy flows from sun to producers to consumers and is eventually lost as heat.

Q5. Which of the following is a pioneer species in primary succession on bare rocks?

A. Ferns
B. Grasses
C. Mosses
D. Lichens

Answer: D. Lichens
Explanation: Lichens are the first to colonize bare rocks by secreting acids that break them down.

Q6. Standing crop refers to:

A. Biomass of producers only
B. Total biomass present in an ecosystem at a given time
C. Rate of energy production
D. Energy flow from one trophic level to another

Answer: B. Total biomass present in an ecosystem at a given time
Explanation: It includes both living producers and consumers.

Q7. Ten percent law of energy flow was proposed by:

A. A. G. Tansley
B. Eugene Odum
C. Charles Elton
D. Lindeman

Answer: D. Lindeman
Explanation: Lindeman proposed the 10% law, stating only 10% of energy is transferred to next trophic level.

Q8. In an aquatic ecosystem, the major autotrophs are:

A. Fungi

B. Phytoplankton
C. Submerged angiosperms
D. Zooplankton

Answer: B. Phytoplankton
Explanation: Phytoplankton are microscopic floating plants that photosynthesize.

Q9. Which of the following is not a decomposer?

A. Earthworm
B. Bacteria
C. Fungi
D. Actinomycetes

Answer: A. Earthworm
Explanation: Earthworm is a detritivore, not a decomposer. Decomposers include bacteria and fungi.

Q10. Which process is not part of the detritus food chain?

A. Fragmentation
B. Humification
C. Leaching
D. Photosynthesis

Answer: D. Photosynthesis
Explanation: Photosynthesis belongs to the grazing food chain, not the detritus food chain.

Q11. The reservoir pool in the carbon cycle is:

A. Fossil fuels
B. Oceans
C. Atmosphere
D. Forest biomass

Answer: C. Atmosphere
Explanation: The atmosphere holds the largest amount of carbon as CO2.

Q12. Match the following:

Column I (Component) Column II (Function)

A. Detritivores 1. Decompose organic matter
B. Producers 2. Convert light into food
C. Decomposers 3. Break down into smaller particles
D. Consumers 4. Feed on producers and others

Options:
A. A-3, B-2, C-1, D-4
B. A-2, B-3, C-4, D-1
C. A-1, B-2, C-3, D-4
D. A-3, B-4, C-2, D-1

Answer: A. A-3, B-2, C-1, D-4
Explanation: Correctly matches the roles of ecosystem components.

Q13. Gross primary productivity minus respiratory losses equals:

A. Net primary productivity
B. Secondary productivity
C. Standing state
D. Assimilation

Answer: A. Net primary productivity
Explanation: NPP = GPP - R (respiration losses).

Q14. Which of the following is true for an ecological pyramid?

A. Always upright in energy
B. Always inverted in biomass
C. Energy pyramid can be inverted
D. Numbers pyramid is always upright

Answer: A. Always upright in energy
Explanation: Energy pyramid is always upright due to energy loss at each level.

Q15. Which ecological pyramid can be inverted?

A. Pyramid of energy only
B. Pyramid of biomass only
C. Pyramid of numbers only
D. Pyramid of biomass and numbers

Answer: D. Pyramid of biomass and numbers
Explanation: Both can be inverted in aquatic ecosystems or forest ecosystems.

Q16. Which of the following represents the correct sequence in the process of decomposition?

A. Fragmentation → Humification → Catabolism → Mineralisation → Leaching
B. Fragmentation → Leaching → Humification → Catabolism → Mineralisation
C. Fragmentation → Leaching → Catabolism → Humification → Mineralisation
D. Leaching → Fragmentation → Catabolism → Humification → Mineralisation

Answer: C. Fragmentation → Leaching → Catabolism → Humification → Mineralisation
Explanation: Decomposition follows this sequence as litter is first broken into small pieces, followed by leaching of soluble substances, enzymatic breakdown, humus formation, and finally nutrient release.

Q17. Which of the following statements is incorrect about humus?

A. It is highly resistant to microbial action
B. It is dark-colored amorphous substance
C. It undergoes rapid decomposition
D. It serves as a reservoir of nutrients

Answer: C. It undergoes rapid decomposition
Explanation: Humus is stable and decomposes very slowly, unlike fresh organic matter.

Q18. Which of the following is not a feature of a climax community?

A. Stable structure
B. Short life cycles
C. High species diversity
D. Equilibrium with environment

Answer: B. Short life cycles
Explanation: Climax communities are stable with long-lived species, not short life cycles.

Q19. The pyramid of biomass is inverted in:

A. Forest ecosystem
B. Pond ecosystem
C. Grassland ecosystem
D. Desert ecosystem

Answer: B. Pond ecosystem
Explanation: In aquatic systems, phytoplankton biomass is less than that of zooplankton, making the pyramid inverted.

Q20. Assertion (A): Energy flow in an ecosystem is unidirectional.

Reason (R): Energy is recycled by decomposers.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: C. A is true, but R is false
Explanation: Energy is not recycled; it flows in one direction and is lost as heat. Nutrients, not energy, are recycled.

Q21. Secondary productivity refers to:

A. Rate of production of organic matter during photosynthesis
B. Rate of assimilation of food by producers
C. Rate of formation of new organic matter by consumers
D. Total biomass available at a given time

Answer: C. Rate of formation of new organic matter by consumers
Explanation: It is the biomass produced by heterotrophs using organic food.

Q22. The percentage of energy transferred from one trophic level to the next is approximately:

A. 1%
B. 10%
C. 50%
D. 100%

Answer: B. 10%
Explanation: As per Lindeman's 10% law, only 10% of energy is transferred to the next level.

Q23. Match the ecological terms with their definitions:

Column I Column II

A. Gross Primary Productivity 1. Total amount of biomass produced
B. Net Primary Productivity 2. GPP minus respiratory losses
C. Standing Crop 3. Biomass available at any time
D. Secondary Productivity 4. Rate of formation by consumers

Options:
A. A-1, B-2, C-3, D-4
B. A-2, B-1, C-4, D-3
C. A-3, B-2, C-1, D-4
D. A-1, B-4, C-2, D-3

Answer: A. A-1, B-2, C-3, D-4
Explanation: Correct matches of terms and their definitions.

Q24. Which of the following represents a grazing food chain?

A. Detritus → Earthworm → Bird
B. Dead leaves → Fungi → Bacteria
C. Grass → Grasshopper → Frog
D. Fallen log → Termite → Woodpecker

Answer: C. Grass → Grasshopper → Frog
Explanation: Starts with living green plants and ends with higher-level consumers.

Q25. The chief source of energy for the ecosystem is:

A. Green plants
B. Fossil fuels
C. Solar energy
D. Soil nutrients

Answer: C. Solar energy
Explanation: Sunlight is the ultimate source of energy for nearly all ecosystems.

Q26. In ecological succession, seral communities are:

A. The initial colonizers
B. Intermediate communities in succession
C. The final stable community
D. Communities that degrade the habitat

Answer: B. Intermediate communities in succession
Explanation: Seral communities represent the transitional stages between pioneer and climax communities.

Q27. Energy content is highest at which trophic level?

A. Secondary consumers
B. Producers
C. Tertiary consumers
D. Primary consumers

Answer: B. Producers
Explanation: Producers capture solar energy; all other levels receive decreasing amounts.

Q28. Which of the following would cause biomagnification?

A. Carbon dioxide
B. Phosphates
C. Mercury
D. Methane

Answer: C. Mercury

Explanation: Mercury accumulates in tissues and increases in concentration at higher trophic levels.

Q29. Which of the following is not part of an ecosystem's nutrient cycle?

A. Carbon
B. Nitrogen
C. Water
D. Energy

Answer: D. Energy
Explanation: Energy flows unidirectionally; it is not recycled like nutrients.

Q30. Which of the following ecosystems has the least net primary productivity?

A. Oceans
B. Coral reefs
C. Tropical rainforests
D. Estuaries

Answer: A. Oceans
Explanation: Oceans have low productivity per unit area due to nutrient limitation, despite covering a large area.

Q31. The main decomposers in an ecosystem are:

A. Earthworms and beetles
B. Bacteria and fungi
C. Algae and cyanobacteria
D. Protozoa and rotifers

Answer: B. Bacteria and fungi
Explanation: These microorganisms break down complex organic matter into simpler inorganic substances.

Q32. Identify the correct food chain:

A. Phytoplankton → Zooplankton → Fish → Hawk
B. Algae → Grasshopper → Snake → Frog

C. Grass → Rabbit → Wolf → Tiger
D. Grass → Deer → Lion → Vulture

Answer: D. Grass → Deer → Lion → Vulture
Explanation: This is a proper food chain with producers, herbivores, carnivores, and scavengers.

Q33. Match the following components with their roles in decomposition:

Component Role

A. Fragmentation 1. Breakdown into smaller particles
B. Leaching 2. Removal of soluble substances
C. Catabolism 3. Enzymatic breakdown of detritus
D. Humification 4. Formation of humus

Options:
A. A-1, B-2, C-3, D-4
B. A-2, B-1, C-4, D-3
C. A-3, B-4, C-1, D-2
D. A-1, B-4, C-2, D-3

Answer: A. A-1, B-2, C-3, D-4
Explanation: These are the correct definitions of each stage in decomposition.

Q34. Which of the following is the correct statement about energy flow?

A. Energy flow is cyclic
B. Only 1% of the sun's energy is used by plants
C. Decomposers transfer 90% energy to herbivores
D. Energy increases at each trophic level

Answer: B. Only 1% of the sun's energy is used by plants
Explanation: A very small fraction of incoming solar energy is captured by autotrophs.

Q35. Assertion (A): Secondary succession occurs on a bare rock surface.

Reason (R): Primary succession occurs in areas where no life existed before.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is false, but R is true
D. Both A and R are false

Answer: C. A is false, but R is true
Explanation: Secondary succession occurs in previously inhabited areas; bare rock is for primary succession.

Q36. Identify the climax community in a terrestrial succession:

A. Lichens
B. Herbs
C. Forest
D. Shrubs

Answer: C. Forest
Explanation: Forests are typically stable and represent the final stage of ecological succession.

Q37. Which of the following is a pioneer species in primary succession on rocks?

A. Moss
B. Fern
C. Lichen
D. Grass

Answer: C. Lichen
Explanation: Lichens can grow on bare rocks and help break them down for later colonizers.

Q38. In aquatic ecosystems, the major autotrophs are:

A. Large aquatic plants
B. Zooplankton
C. Phytoplankton
D. Algae-eating fish

Answer: C. Phytoplankton
Explanation: These microscopic autotrophs perform photosynthesis and are the base of aquatic food chains.

Q39. In a food chain, which organism receives the least amount of energy?

A. Producer
B. Primary consumer
C. Secondary consumer
D. Tertiary consumer

Answer: D. Tertiary consumer
Explanation: Energy decreases at each level due to loss as heat and metabolic processes.

Q40. Which ecosystem has the highest net primary productivity?

A. Desert
B. Tundra
C. Estuary
D. Tropical rainforest

Answer: D. Tropical rainforest
Explanation: Due to warm, moist conditions and high biodiversity, tropical rainforests are highly productive.

Q41. Which of the following is an example of ecological pyramid of energy?

A. Always upright
B. May be inverted
C. Always inverted
D. Zigzag

Answer: A. Always upright
Explanation: Energy pyramid cannot be inverted because energy decreases with each level.

Q42. In a detritus food chain, the starting material is:

A. Live plant biomass
B. Green photosynthetic organisms
C. Dead organic matter
D. Herbivores

Answer: C. Dead organic matter
Explanation: Detritus food chains begin with decomposing plant/animal matter.

Q43. Which factor directly affects primary productivity?

A. Herbivore population
B. Decomposer activity
C. Solar radiation and nutrients
D. Top carnivore population

Answer: C. Solar radiation and nutrients
Explanation: These two determine how much organic matter producers can generate.

Q44. Assertion (A): Ecosystem services include nutrient cycling, pollination, and climate regulation.

Reason (R): These services have no economic value.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: C. A is true, but R is false
Explanation: Ecosystem services do have economic value, often in billions of dollars globally.

Q45. Which of the following is not a characteristic of energy flow in an ecosystem?

A. Unidirectional
B. Cyclic
C. Decreases at higher levels
D. Cannot be recycled

Answer: B. Cyclic
Explanation: Energy flow is linear and unidirectional, not cyclic like nutrients.