* **Choose the correct alternative from those given below question** [12]

1. What is the primary role of decomposers in an ecosystem?
   (A) Producing food through photosynthesis
   (B) Breaking down dead matter to recycle nutrients
   (C) Consuming only plants
   (D) Preying on top carnivores

   Ans. : (B) Breaking down dead matter to recycle nutrients

2. Which of the following is an abiotic component of a habitat?
   (A) Birds (B) Water (C) Insects (D) Trees

   Ans. : (B) Water

3. In a food chain, which trophic level is occupied by herbivores?
   (A) First (B) Second (C) Third (D) Fourth

   Ans. : (B) Second

4. What is a likely consequence of overfishing in a pond ecosystem?
   (A) Increase in dragonfly population
   (B) Increase in fish population
   (C) Decrease in plant seed production
   (D) Increase in water quality

   Ans.: (A) Increase in dragonfly population

5. Which human activity is a threat to the Sundarbans mangrove ecosystem?
   (A) Reforestation (B) Illegal hunting
   (C) Organic farming (D) Wildlife conservation

   Ans. : (B) Illegal hunting

6. Assertion (A): The removal of frogs from a food chain can increase the grasshopper population.
   Reason (R): Frogs are natural predators of grasshoppers.
   (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.

   Ans.: (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

7. Assertion (A): Synthetic fertilizers improve soil health in the long term.
Reason (R): They reduce the population of beneficial microorganisms in the soil.
(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.

Ans.: (A) Both (A) and (R) are true, and (R) is the correct explanation of (A).

8. What is the main source of energy for producers in an ecosystem?
(A) water (B) sunlight (C) soli (D) air

Ans. : self

9. Which organism is classified as a decomposer?
(A) Deer (B) Mushroom (C) Eagle (D) Grasshopper

Ans. : self

10. What happens to pest populations when frog numbers decrease?
(A) They decrease (B) They stay the same
(C) They increase (D) They disappear

Ans. : self

11. Which of the following is an example of an abiotic component?
(A) Fish (B) Rocks (C) Insects (D) Plants

Ans. : self

12. What was a major reason for the ban on frog leg exports in India?
(A) Lack of demand (B) Ecological damage
(C) High production costs (D) Disease outbreak

Ans. : self

*** Answer the following as requested in detail.** **[5]**

13. Researchers conducted a study to see how fish in ponds affect seed production in the plants nearby. They observed two ponds with fish and a large number of flowering plants around them; B without fish and fewer flowering plants around it (Fig.). Think of a reason for these observations.

Pond A Pond B

Pond A with fish and Pond B without fish

Q.1. Compare the number of dragonflies, bees, and butterflies in both ponds.

Q.2. Think of a reason for these observations.

Q.3. What does this study show? How does the population of fish in a pond affect seed production in nearby plants?

Ans. : 1. Pond A (with fish): Fewer dragonflies, more bees and butterflies.
Pond B (without fish): More dragonflies, fewer bees and butterflies.
Reason: Fish eat dragonfly larvae, reducing the adult dragonfly population in Pond A. With fewer dragonflies (which prey on bees and butterflies), the number of pollinators (bees, butterflies) increases in Pond A. In Pond B, the absence of fish allows dragonfly larvae to thrive, leading to more dragonflies that reduce bee and butterfly populations.

2. The presence of fish in Pond A controls the dragonfly population by preying on their larvae. Fewer dragonflies mean less predation on bees and butterflies, allowing more pollination of flowering plants, which leads to a higher number of plants and seed production. In Pond B, without fish, dragonflies increase, reducing pollinators and thus limiting plant growth and seed production.

3. What it shows: The study demonstrates an indirect effect where fish influence plant seed production through the food web. Fish reduce dragonfly larvae, leading to fewer dragonflies, which allows more bees and butterflies to pollinate plants, increasing seed production.

Effect of fish population: A higher fish population in a pond decreases dragonfly numbers, indirectly boosting pollinator populations (bees, butterflies), which enhances pollination and seed production in nearby plants. Conversely, no fish (as in Pond B) leads to more dragonflies, fewer pollinators, and lower seed production.

*** Fill in the blanks:** **[10]**

14. The process by which plants make their own food using sunlight is called _____

Ans. : Photosynthesis

15. A group of the same type of organisms living together in a habitat is known as a _____

Ans. : Population

16. The relationship where one organism benefits and the other is harmed is called _____

Ans. : Parasitism

17. _____ forests in the Sundarbans protect coastal areas from storms and floods.

Ans. : Mangrove

18. The Green Revolution introduced _____ to increase food production in India.

Ans. : Synthetic Fertilisers and Pesticides

19. A group of the same species living in a habitat is called a _____

Ans. : self

20. _____ is the process by which plants make their own food using sunlight.

Ans. : self

21. The relationship where both organisms benefit is known as _____

Ans. : self

22. _____ forests help protect coastal areas from storms and floods.

Ans. : self

23. The Green Revolution introduced _____ to boost agricultural yields.

Ans. : self

*** Answer the following questions in short.** **[38]**

24. Can human actions cause natural disasters?

Ans. : Human actions can exacerbate or trigger events that resemble natural disasters. For example, deforestation and pollution can worsen floods or storms by destabilising soil and altering weather patterns. Overuse of pesticides can disrupt ecosystems, indirectly contributing to environmental imbalances.

25. How might the loss of forest cover and changes in rainfall patterns lead elephants to enter human farms and villages?

Ans. : Loss of forest cover reduces vegetation and habitat space, while changes in rainfall patterns can dry up waterholes, making food and water scarce in elephants' natural habitats. As a result, elephants wander into nearby farms and villages in search of crops like bananas and sugarcane, leading to crop damage and potential harm to humans and animals.

26. If two kinds of birds compete for the same fruit, how might their way of living change over time?

Ans. : Competition may lead to niche differentiation, where one bird species adapts to feed at different times or on different parts of the fruit tree to reduce competition. Over time, they may evolve distinct beak shapes or feeding behaviours, or one species may dominate, forcing the other to find alternative food sources or habitats.

27. Human-made ecosystems like agricultural fields are necessary, but they must be made sustainable.' Comment on the statement.

Ans. : Agree. Agricultural fields provide food but often use unsustainable practices (e.g., synthetic fertilisers, monoculture) that degrade soil and harm biodiversity. Sustainable methods (e.g., organic farming, crop rotation) ensure long-term productivity and environmental health.

28. Observe two different places near your home or school (e.g., a park and a roadside). List the living and non¬living components you see. How are the two ecosystems different?

Ans. : We can see some common things near our home and school, such as

• Park: Living (trees, birds, squirrels, grass); Non-living (soil, water, benches, sunlight).

• Roadside: Living (weeds, insects); Non-living (asphalt, dust, car exhaust).

Differences: The park is a designed ecosystem with diverse plants and animals, supported by soil and water, while the roadside is a disturbed, human-altered area with fewer species and more pollution.

29. Selvam from Cuddalore district, Tamil Nadu, shared that his milage was less affected by the 2004 Tsunami compared to nearby milages due to the presence of mangrove forests. This surprised Sarita, Shabnam, and Shijo. They wondered if mangroves were protecting the village. Can you help them understand this?

Ans. : Yes, mangroves protected the village. Mangrove forests act as natural barriers, slowing down strong winds and waves during storms and tsunamis. Their roots stabilize soil, reducing erosion, and they absorb water impact, protecting coastal areas. The Sundarbans' mangroves, a World Heritage Site, demonstrate this protective role.

30. Why is it not possible to have an ecosystem with only producers and no consumers or decomposers?

Ans. : An ecosystem needs consumers to regulate producer populations (e.g., herbivores eat plants) and decomposers to recycle dead matter into nutrients for producers. Without consumers, producers would overgrow and die from competition; without decomposers, nutrients would not cycle, collapsing the system.

31. Name one producer found in a pond ecosystem.

Ans. : self

32. What is the role of vultures in a food chain?

Ans. : self

33. Give an example of a carnivore.

Ans. : self

34. What is an ecosystem service provided by decomposers?

Ans. : self

35. Name one human activity that harms the Sundarbans ecosystem.

Ans. : self

36. Explain the difference between a food chain and a food web.

Ans. : self

37. How do mangroves protect coastal villages during natural disasters?

Ans. : self

38. What are the effects of overfishing on a pond ecosystem?

Ans. : self

39. Suggest two ways students can support butterfly populations in a garden.

Ans. : self

40. Describe how the removal of a species from a food chain affects other organisms, using the example of frogs.

Ans. : self

41. Discuss the impact of the Green Revolution on Indian agriculture and propose two sustainable farming practices.

Ans. : self

42. Explain the importance of nutrient cycling in an ecosystem and the role of decomposers in this process.

Ans. : self

*** State whether the following sentences are true or false. Correct the false sentences and rewrite them.** **[10]**

43. All ecosystems can function without decomposers.

Ans. : false

44. Mangroves can help reduce the impact of tsunamis on coastal villages.

Ans. : true

45. Herbivores occupy the top trophic level in a food chain.

Ans. : false

46. Overuse of pesticides can lead to the development of pest resistance.

Ans. : true

47. A food web is a single linear sequence of who eats whom.

Ans. : false

48. All ecosystems can survive without decomposers.

Ans. : self

49. Mangroves have no role in reducing the impact of tsunamis.

Ans. : self

50. Herbivores are found at the top of the food chain.

Ans. : self

51. Overuse of pesticides can lead to the development of pest resistance.

Ans. : self

52. A food web consists of a single feeding relationship.

Ans. : self

*** Answer the following questions in short.** **[39]**

53. Do you think the Earth can thrive without humans? Can humans survive without the Earth?

Ans. : • Earth without humans: Yes, Earth can thrive without humans. Ecosystems, such as forests and aquatic systems, function through natural interactions (e.g., food chains, nutrient cycling) without human intervention. Protected areas like national parks show ecosystems can self-sustain.
• Humans without Earth: No, humans cannot survive without Earth, as they depend on ecosystems for air, water, food, and resources essential for survival.

54. Imagine you are a tree in a dense forest. What kind of relationships would you have with water, sunlight, other animals, and other components of the forest?

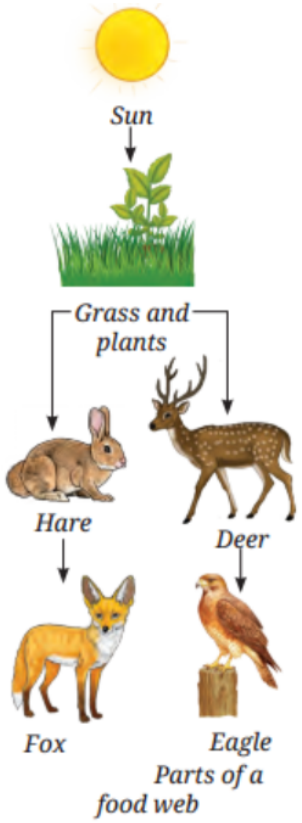
Ans. : As a tree, I would:
• Water: Absorb water from the soil for photosynthesis and growth.
• Sunlight: Use sunlight to produce food via photosynthesis.
• Other Animals: Provide shelter, food (fruits, leaves), and oxygen for animals; animals like birds and insects aid in pollination and seed dispersal.
• Other Components: Interact with soil for nutrients and stability, contribute to air quality by releasing oxygen, and help retain soil moisture to prevent erosion.

55. A population is part of a community. If all decomposers suddenly disappeared from a forest ecosystem, what changes do you think would occur? Explain why decomposers are essential.

Ans. : Changes: Dead plants and animals would accumulate, nutrients would not return to the soil, and plant growth would decline. This could lead to a reduction in herbivore and carnivore populations due to food scarcity.

Why Essential: Decomposers (e.g., fungi, bacteria) break down dead matter into simpler substances, recycling nutrients like nitrogen and carbon back into the soil for plants. Without them, the nutrient cycle would stop, disrupting the food web.

56. If the Indian hare population (Fig.) drops because of a disease, how would it affect the number of other organisms?



Parts of a food web

Ans. : • Predators: The numbers of foxes and eagles would decrease due to reduced prey (hares), leading to food scarcity.

• Plants: Grass and plant populations might increase initially without hare grazing, but overgrowth could alter the habitat.

• Deer: Since deer aren't preyed on by foxes or eagles, their role in this particular chain isn't disturbed directly.

• Why: A decline in a key herbivore like the hare disrupts the food web, affecting both higher (predators) and lower (plants) trophic levels.

57. In a school garden, students noticed fewer butterflies the previous season. What could be the possible reasons? What steps can students take to have more butterflies on campus?

Ans. : • Possible reasons: Possible causes include pesticide use killing larvae, loss of nectar plants, or increased predators (e.g., birds). Monoculture or pollution might also reduce habitat quality.

• The steps we can take: Plant diverse nectar-rich flowers (e.g., marigolds), avoid

pesticides, create sheltered areas, and install butterfly feeders or water sources to attract and support butterflies.

58. Look at this food chain:
Grass → Grasshopper → Frog → Snake
If frogs disappear from this ecosystem, what will happen to the population of grasshoppers and snakes? Why?

Ans. : • Grasshoppers: The population would likely increase because frogs, their main predators, are gone, reducing predation pressure.
• Snakes: The population would decrease because frogs are their primary food source, leading to food scarcity.
• Why: In a food chain, the removal of a middle trophic level (frogs) disrupts the balance. Fewer predators allow prey (grasshoppers) to multiply, while the loss of prey affects higher predators (snakes).

59. Explain the structure and importance of a food web in an ecosystem with examples.

Ans. : A food web is a network of interconnected food chains showing multiple feeding relationships. It includes producers (e.g., grass), herbivores (e.g., grasshoppers, hares), carnivores (e.g., frogs, snakes), and top carnivores (e.g., eagles), with decomposers (e.g., mushrooms) recycling nutrients. For example, grass → grasshopper → frog → snake → eagle overlaps with grass → hare → fox, where snakes might eat hares. Its importance lies in providing resilience; if one species declines (e.g., frogs), others (e.g., snakes) can adapt by finding alternative prey, maintaining energy flow, and ecosystem stability.

60. Discuss the ecological consequences of the Green Revolution in India and suggest sustainable alternatives.

Ans. : The Green Revolution introduced synthetic fertilisers and pesticides, boosting food production but causing soil degradation, pest resistance, and reduced biodiversity. Overuse of hardened soil killed beneficial organisms (e.g., earthworms) and increased irrigation needs. Sustainable alternatives include organic farming with compost or Kunapajala, crop rotation, and diversity to reduce pests naturally, promoting long-term soil health and ecosystem balance.

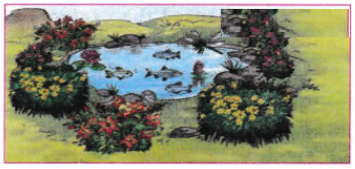
61. Describe how human activities can disrupt ecosystem balance, using the example of frog harvesting in the 1980s.

Ans. : Human activities like over-harvesting disrupt ecosystems by removing key species. In the 1980s, exporting frog legs reduced frog populations, natural pest controllers. This led to more agricultural pests, increased pesticide use, soil and water pollution, and health risks. The imbalance shows how removing a middle trophic level affects prey (pests increase) and predators (e.g., snakes decline), necessitating the export ban to restore balance.

62. Explain the role of mangroves in protecting coastal ecosystems, with reference to the 2004 Tsunami.

Ans. : Mangroves protect coastal ecosystems by acting as natural barriers, slowing winds and waves during storms and tsunamis. Their roots stabilise soil, reducing erosion, and absorbing water impact. During the 2004 Tsunami, Cuddalore village in Tamil Nadu, with mangrove forests, was less affected than nearby areas, demonstrating their protective role. The Sundarbans' mangroves further highlight this, safeguarding biodiversity and human settlements.

63. In a study of Pond A and Pond B, researchers found that Pond A with fish had more flowering plants, while Pond B without fish had fewer. Analyse why this difference occurred and suggest one human impact that could reverse it.



Pond (A)

Pond (B)

Ans. : The difference occurred because fish in Pond A eat dragonfly larvae, reducing adult dragonflies that prey on pollinators (bees, butterflies). More pollinators in Pond A increased plant pollination and seed production. In Pond B, without fish, more dragonflies reduced pollinators, lowering plant numbers. A human impact like overfishing could reverse this in Pond A by decreasing fish, allowing dragonflies to increase, reducing pollinators, and thus decreasing flowering plants.

64. Farmers in a village reported a decline in soil health after years of using synthetic fertilisers. They noticed fewer earthworms and harder soil. Suggest two sustainable practices they could adopt and explain their benefits.

Ans. : Two sustainable practices are using compost or Kunapajala and practicing crop rotation. Compost adds organic matter, enriching soil and supporting earthworms, which improve soil structure. Crop rotation diversifies plants, reducing pest buildup and maintaining nutrient levels, preventing soil hardening, and enhancing long-term fertility.

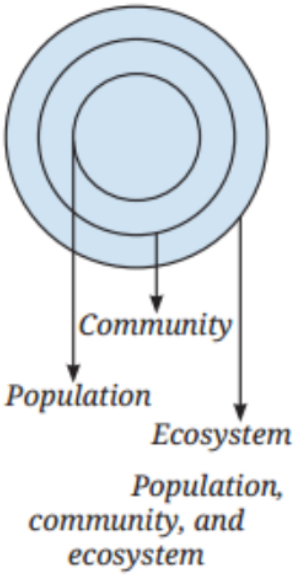
65. The Sundarbans mangrove ecosystem faces threats from illegal hunting and fuelwood collection. A conservation group proposes replanting mangroves and enforcing laws. Evaluate the effectiveness of these measures.

Ans. : Replanting mangroves would restore natural barriers, protecting against storms and erosion, and support biodiversity, as seen with the 2004 Tsunami

protection. Enforcing laws would reduce illegal hunting and wood collection, preserving flora and fauna. Both measures are effective: replanting rebuilds the ecosystem, while law enforcement prevents further damage, ensuring long-term sustainability of this World Heritage Site.

*** Answer the following questions in on sentence** **[17]**

66. Refer to the given diagram (Fig.) and select the wrong statement.



(i) A community is larger than a population.
(ii) A community is smaller than an ecosystem.
(iii) An ecosystem is part of a community.

Ans. : (iii) An ecosystem is part of a community.

67. What is the top trophic level in a food chain?

Ans. : Top carnivores (e.g., eagle).

68. Name one producer in a forest ecosystem.

Ans. : Tree

69. What role do decomposers play in an ecosystem?

Ans. : They break down dead matter to recycle nutrients

70. Give an example of a herbivore.

Ans. : Deer

71. What is the primary source of energy for producers?

Ans. : Sunlight

72. Name one ecosystem service provided by mangroves.

Ans. : Protection from tsunamis and storms.

73. What is a food chain?

Ans. : A linear sequence showing who eats whom in an ecosystem.

74. What caused the decline of frogs in India during the 1980s?

Ans. : Large-scale harvesting for frog leg exports.

75. Name one abiotic component of a pond.

Ans. : Water

76. Explain the difference between a community and an ecosystem.

Ans. : A community is all the populations of different species living and interacting in a habitat, while an ecosystem includes the community plus abiotic components like water and soil. For example, a pond community includes fish and plants, but an ecosystem adds water and sunlight.

77. How do fish indirectly affect seed production in plants near a pond?

Ans. : Fish eat dragonfly larvae, reducing adult dragonflies. Fewer dragonflies mean less predation on pollinators (bees, butterflies), increasing pollination and seed production.

78. What are the effects of the overuse of synthetic fertilizers on soil?

Ans. : Overuse hardens soil, reduces earthworm populations, decreases organic matter, and increases irrigation needs, leading to long-term fertility loss.

79. Describe one example of mutualism in nature.

Ans. : Honeybees and flowers exhibit mutualism, where bees pollinate flowers for reproduction, and flowers provide nectar for bees.

80. Why did the Government of India ban frog leg exports?

Ans. : The ban was imposed to protect frog populations, which control pests naturally. Their decline increased agricultural pests and pesticide use, harming the environment, so the ban aimed to restore ecological balance.

81. What is an ecological pyramid, and what does it show?

Ans. : An ecological pyramid is a graphical representation of the number, biomass, or energy at each trophic level. It shows that producers are most abundant at the base, while top carnivores are fewest at the top, reflecting energy loss.

82. How can students help increase butterfly populations in a school garden?

Ans. : Students can plant nectar-rich flowers, avoid pesticides, create sheltered areas, and provide water sources to attract and support butterflies.

*** Match the Following.** **[24]**

83.

Column A	Column B
Q.1. Tree	(a) Breaks down dead matter
Q.2. Deer	(b) Eats insects
Q.3. Vulture	(c) Performs photosynthesis

Q.4. Frog	(d) Eats grass and leaves

Ans. :

Column A	Column B
1. Tree	(c) Performs photosynthesis
2. Deer	(d) Eats grass and leaves
3. Vulture	(a) Breaks down dead matter
4. Frog	(b) Eats insects

84.

Column A	Column B
Q.1. Mushroom	(a) Eats other birds
Q.2. Bengal Fox	(b) Preys on small mammals
Q.3. Shikra (Bird)	(c) Eats frogs or grasshoppers
Q.4. Snake	(d) Eats both plants and animals

Ans. :

Column A	Column B
1. Mushroom	(b) Preys on small mammals
2. Bengal Fox	(d) Eats both plants and animals
3. Shikra (Bird)	(a) Eats other birds
4. Snake	(c) Eats frogs or grasshoppers

85.

Column A	Column B
Q.1. Population	(a) Grass → Grasshopper → Frog
Q.2. Community	(b) All deer in a forest
Q.3. Ecosystem	(c) All species in a pond
Q.4. Food Chain	(d) Pond with fish, plants, and water

Ans. :

Column A	Column B
1. Population	(b) All deer in a forest
2. Community	(c) All species in a pond
3. Ecosystem	(d) Pond with fish, plants, and water
4. Food Chain	(a) Grass → Grasshopper → Frog

86.

Column A	Column B
Q.1. Mutualism	(a) Mangroves slow tsunami waves
Q.2. Parasitism	(b) Honeybees and flowers
Q.3. Decomposition	(c) Ticks on a dog
Q.4. Ecosystem Service	(d) Fungi breaking down dead leaves

Ans. :

Column A	Column B
1. Mutualism	(b) Honeybees and flowers
2. Parasitism	(c) Ticks on a dog
3. Decomposition	(d) Fungi breaking down dead leaves
4. Ecosystem Service	(a) Mangroves slow tsunami waves

87.

Column A	Column B
Q.1. Grass	(a) Second
Q.2. Hare	(b) Third
Q.3. Snake	(c) First
Q.4. Eagle	(d) Fourth

Ans. : self

88.

Column A	Column B
Q.1. Mutualism	(a) Frog eating insects
Q.2. Parasitism	(b) Honeybees and flowers
Q.3. Predation	(c) Ticks on a dog
Q.4. Commensalism	(d) Orchids on tree branches

Ans. : self

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