LIFE ON EARTH

Class 09 - Social Science (Understanding Society)

Time Allowed: 1 hour and 30 minutes **Maximum Marks: 145**

1. How do biosphere reserves serve as buffers against natural disasters like floods and storms? **[1]**

   a) Natural features like forests and wetlands absorb excess water and prevent erosion.

   b) They construct artificial barriers to deflect extreme weather events.

   c) They prevent all natural disasters from occurring within their boundaries.

   d) They relocate human populations before any disaster strikes.

2. In which year was the first biosphere reserve established globally? **[1]**

   a) 1980 b) 1965

   c) 1976 d) 1971

3. What is a defining characteristic of the tropical rainforest biome regarding its climate? **[1]**

   a) Moderate climate with four distinct seasons b) A distinct dry season and wet season

   c) Extremely low rainfall, less than 25 cm annually d) Hot and humid throughout the year with no distinct dry season

4. Which Indian biosphere reserve was designated first (oldest)? **[1]**

   a) Dibru-Saikhowa b) Gulf of Mannar Biosphere Reserve

   c) Panna Biosphere Reserve d) Nilgiri Biosphere Reserve

5. Which international program recognizes biosphere reserves to encourage a balanced relationship between humans and nature? **[1]**

   a) International Union for Conservation of Nature (IUCN) b) United Nations Environment Programme (UNEP)

   c) World Wildlife Fund (WWF) d) UNESCO's Man and the Biosphere (MAB) Programme

6. How do biosphere reserves contribute to maintaining ecological balance, specifically concerning food chains? **[1]**

   a) By introducing non-native species to enhance competition.

   b) By ensuring the interconnectedness of organisms, maintaining intact food chains and webs.

   c) By removing apex predators to protect herbivore populations.

   d) By converting natural habitats into agricultural fields.

7. What climatic condition is typical for desert biomes, besides very low rainfall? **[1]**

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a) Consistent humidity with seasonal rains

b) Significant temperature fluctuations between day and night

c) Moderate temperatures throughout the year

d) Freezing conditions coupled with high wind speeds

8. What is the key purpose of Community Forest Resource Rights (CFRR) under the Forest Rights Act, 2006? **[1]**

a) To allow communities to collect and use forest produce.

b) To provide individual ownership of forest land.

c) To empower Gram Sabhas to conserve and manage community forests.

d) To promote large-scale farming in forest regions.

9. Which of the following activities is NOT listed as a major cause of degradation of forest ecosystems? **[1]**

a) Illegal hunting and poaching

b) Deforestation

c) Establishment of protected areas

d) Habitat loss

10. Which characteristic specifically describes the vegetation found in temperate forests? **[1]**

a) Deciduous trees that shed leaves seasonally

b) Evergreen broadleaf trees that form a continuous canopy

c) Low-growing mosses, lichens, and shrubs

d) Mainly short herbaceous plants

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11. What is the approximate area of the Gulf of Mannar Biosphere Reserve, identified as the largest in India? **[1]**

a) 765 sq km

b) 10,500 sq km

c) 14,000 sq km

d) 5,520 sq km

12. Which biome features permanently frozen ground beneath the surface, known as permafrost, limiting vegetation to mosses, lichens, grasses, and small shrubs? **[1]**

a) Temperate grassland biome

b) Desert biome

c) Tundra biome

d) Taiga biome

13. What is the primary reason why the soil in tropical rainforests is often thin and less fertile? **[1]**

a) Heavy rainfall washing away nutrients

b) Presence of a dense canopy preventing sun exposure

c) Lack of organic matter due to rapid decomposition

d) High temperatures breaking down nutrients rapidly

14. What is the primary characteristic of the Tundra biome regarding its subterranean conditions? **[1]**

a) Extensive underground cave systems

b) Deep, nutrient-rich sediment layers

c) Permanently frozen subsoil

d) Highly fertile soil

15. Which of the following is a direct consequence of deforestation related to soil health? **[1]**

a) Soil erosion
b) Disruption of the water cycle.
c) Loss of natural habitats.
d) Increase in carbon dioxide levels.

16. What is one of the primary aims of sustainable tourism regarding natural resources? **[1]**

a) To maximize immediate economic profit for developers.
b) To promote continuous expansion of tourist infrastructure.
c) To ensure long-term availability of resources for future generations.
d) To facilitate unrestricted access to all natural areas.

17. Which of the following is NOT listed as a basic need forest communities rely on forests for? **[1]**

a) Fuel
b) Shelter
c) Food
d) Education

18. How does vegetation within a biosphere reserve influence local and global climatic conditions? **[1]**

a) By increasing ground temperature significantly during the day.
b) By removing all oxygen from the atmosphere.
c) By regulating the amount of water vapour in the atmosphere through transpiration.
d) By decreasing atmospheric moisture through intense heat reflection.

19. What is the primary aim of establishing biosphere reserves? **[1]**

a) To promote industrial development in protected regions.
b) To conserve biodiversity while fostering sustainable development.
c) To create areas solely for scientific research without human involvement.
d) To exclusively protect endangered animal species.

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20. Which factor is considered the most significant in determining the types of plants and animals that survive in a particular biome? **[1]**

a) Climate
b) Soil type
c) Altitude
d) Latitude

21. Why is the loss of a single species in an ecosystem problematic for ecological balance? **[1]**

a) It only impacts species directly predated by the lost species, with no further effects.
b) It can disrupt processes like pest control or nutrient cycling, leading to a decline in biodiversity.
c) It directly leads to the immediate collapse of the entire ecosystem.
d) It promotes human intervention to replace the lost role, enhancing sustainability.

22. Which human activity is explicitly mentioned as a cause of forest fires due to controlled burns for cultivation? **[1]**

a) Agricultural practices
b) Urban development

c) Illegal hunting
d) Road construction

23. Which of the following is considered a type of Alternative Tourism? **[1]**

a) Agri-tourism
b) Standard Tourism
c) Conventional Tourism
d) Mass Tourism

24. Which organization defines ecotourism as 'responsible travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education'? **[1]**

a) The World Wide Fund for Nature (WWF)
b) The United Nations World Tourism Organization (UNWTO)
c) The International Union for Conservation of Nature (IUCN)
d) The International Ecotourism Society (TIES)

25. What does the concept of 'ecosystem services' mean in the context of biosphere reserves? **[1]**

a) Economic benefits derived purely from tourism in the reserve.
b) Services provided by humans to improve the ecosystem.
c) The management services offered by conservation organizations.
d) Natural processes that benefit humans and other organisms, such as air purification and nutrient cycling.

26. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Global Recognition	(I) Protection from overexploitation
(B) Sovereign Control	(II) International endorsement of sites
(C) Resource Protection	(III) National government management
(D) Scientific Monitoring	(IV) Regular observation of ecological changes

a) A-II, B-III, C-I, D-IV
b) A-IV, B-I, C-III, D-II
c) A-III, B-IV, C-II, D-I
d) A-I, B-II, C-III, D-IV

27. Match the items in List I with those List II. **[1]**

List I	List II
(A) Core Zone	(I) Area for research and education
(B) Buffer Zone	(II) Legally protected natural area
(C) Transition Zone	(III) Human settlements and sustainable resource use
(D) UNESCO MAB Programme	(IV) Global initiative for human-nature harmony

a) A-I, B-II, C-IV, D-III
b) A-III, B-IV, C-I, D-II
c) A-IV, B-III, C-II, D-I
d) A-II, B-I, C-III, D-IV

28. Match the items in List I with those List II. **[1]**

List I	List II

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(A) Ecosystem Services	(I) Maintenance of food webs
(B) Habitat Diversity	(II) Provision of clean air and water
(C) Ecological Balance	(III) Variety of natural environments
(D) Buffer against Disasters	(IV) Natural protection from extreme events

a) A-IV, B-III, C-I, D-II
b) A-III, B-IV, C-II, D-I
c) A-II, B-III, C-I, D-IV
d) A-I, B-II, C-IV, D-III

29. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Habitat loss	(I) Replanting trees in areas previously forested
(B) Reforestation	(II) Legal frameworks for resource preservation
(C) Deforestation	(III) Destruction or alteration of natural environments
(D) Conservation measures	(IV) Large-scale removal of trees for other land uses

a) A-I, B-III, C-II, D-IV
b) A-II, B-IV, C-I, D-III
c) A-IV, B-I, C-III, D-II
d) A-III, B-I, C-IV, D-II

30. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Climate Regulation	(I) Prevention of soil loss
(B) Species Interdependence	(II) Moderation of atmospheric conditions
(C) Soil Formation	(III) Reliance of organisms on each other
(D) Erosion Control	(IV) Creation of fertile top layer

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a) A-II, B-III, C-IV, D-I
b) A-I, B-IV, C-II, D-III
c) A-IV, B-I, C-III, D-II
d) A-III, B-II, C-I, D-IV

31. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Afforestation	(I) Uncontrolled combustion in natural areas
(B) Poaching	(II) Planting trees in previously non-forested land
(C) Forest fire	(III) Protection of species through legal means
(D) Wildlife protection laws	(IV) Illegal capture or killing of wild animals

a) A-IV, B-II, C-III, D-I
b) A-II, B-IV, C-I, D-III
c) A-II, B-I, C-IV, D-III
d) A-I, B-III, C-II, D-IV

32. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Human-nature harmony program	(I) Specific region with notable ecosystems

(B) Designated protected area	(II) Global network of conservation sites
(C) World Network of Reserves	(III) Man and the Biosphere (MAB) initiative
(D) Biosphere Reserve characteristic	(IV) Area for combined conservation and development

a) A-III, B-IV, C-II, D-I
b) A-II, B-III, C-I, D-IV
c) A-IV, B-I, C-III, D-II
d) A-I, B-II, C-IV, D-III

33. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Climate change	(I) Monitoring forest conditions with technology
(B) Early detection	(II) Contributes to increased fire risks
(C) Sustainable use	(III) Responsible management of natural resources
(D) Community participation	(IV) Local involvement in forest protection initiatives

a) A-I, B-III, C-II, D-IV
b) A-II, B-I, C-III, D-IV
c) A-IV, B-II, C-I, D-III
d) A-III, B-IV, C-II, D-I

34. Match the items in List I with those in List II. **[1]**

List I	List II
(A) National Parks	(I) Accumulation of dead plant material
(B) Human activities	(II) Controlled burning to reduce fuel load
(C) Fuel for fires	(III) Designated areas for wildlife and habitat protection
(D) Prescribed burns	(IV) Major source of forest fire ignitions

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a) A-III, B-IV, C-I, D-II
b) A-II, B-III, C-IV, D-I
c) A-IV, B-I, C-II, D-III
d) A-I, B-II, C-III, D-IV

35. Match the items in List I with those in List II. **[1]**

List I	List II
(A) Research and monitoring	(I) Sustaining resource usage for population
(B) Environmental education	(II) Investigating ecological processes
(C) Sustainable resource use	(III) Imparting knowledge on ecological principles
(D) Global importance	(IV) International recognition of conservation areas

a) A-III, B-I, C-IV, D-II
b) A-I, B-IV, C-II, D-III
c) A-II, B-III, C-I, D-IV
d) A-IV, B-II, C-III, D-I

36. **Assertion (A):** A specific biome found at high latitudes is characterized by long, frigid winters and ground that remains permanently frozen just beneath the surface. **[1]**
Reason (R): The vegetation in this biome is typically limited to low-growing forms like mosses and lichens because the permafrost prevents deep root penetration and nutrient cycling is slow.

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

37. **Assertion (A):** A specific biome experiences extremely low rainfall, often less than 20 cm annually, leading to sparse vegetation comprising plants with adaptations like deep roots or thick stems. **[1]**
Reason (R): The biotic components in this biome, such as certain reptiles and small mammals, are primarily nocturnal to avoid intense daytime heat.

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

38. **Assertion (A):** Global climate patterns are influenced by the atmospheric processes occurring within extensive vegetated regions. **[1]**
Reason (R): Large-scale terrestrial vegetation actively participates in the water cycle through transpiration, releasing substantial amounts of water vapor into the atmosphere.

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

39. **Assertion (A):** The loss of specific habitats within an ecological system can lead to the extinction of species. **[1]**
Reason (R): Each species is adapted to a unique set of environmental conditions and resources provided by its natural habitat.

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

40. **Assertion (A):** Ecological corridors are crucial for maintaining ecological balance and biodiversity in fragmented landscapes. **[1]**
Reason (R): They facilitate gene flow and allow species to move between isolated habitats, enhancing population viability.

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

41. How does illegal hunting primarily threaten the survival of endangered species? **[2]**
42. Explain how the practice of establishing designated protected areas, often with religious or cultural significance, contributes to the preservation of diverse plant and animal species. **[2]**
43. List two key objectives of establishing internationally recognized protected areas that integrate human activities with nature conservation. **[2]**
44. Elaborate on how habitat destruction occurs due to the unplanned expansion of tourism infrastructure. **[2]**

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45. Justify how variations in altitude can lead to diverse ecological communities within a relatively small geographical area, despite similar latitudinal positions. **[2]**
46. Name two human activities that are primary contributors to the degradation of forest ecosystems. **[2]**
47. Describe how these designated areas contribute to the provision of habitat for diverse species. **[2]**
48. Describe three core functions or objectives that are universally recognized for these protected areas aimed at fostering a sustainable human-environment relationship. **[2]**
49. How does ecotourism promote environmental awareness among visitors? **[2]**
50. Explain the primary reasons why biomes located at similar latitudes but on different continents can exhibit comparable characteristics, such as vegetation types and prevalent animal adaptations. **[2]**
51. Explain how the overuse of natural resources by tourist facilities contributes to environmental degradation. **[2]**
52. What is the primary purpose of Individual Forest Rights (IFR) under relevant legislation for forest-dwelling communities? **[2]**
53. Explain how the displacement caused by large-scale development projects negatively affects the social structures and cultural identity of forest-dwelling communities. **[2]**
54. Explain the primary goal of the global initiative that designates certain protected areas to achieve a balanced relationship between human activities and nature. **[2]**
55. What primary ecological role do trees play in regulating atmospheric conditions? **[2]**
56. Describe the key environmental conditions and characteristic plant types found in a biome located at very high latitudes, where the ground remains permanently frozen beneath the surface. **[3]**
57. Define deforestation and explain how it contributes to increased atmospheric carbon dioxide levels. **[3]**
58. Analyze why soil characteristics play a crucial, albeit indirect, role in structuring the biological communities within a specific biome. **[3]**
59. How do invasive species contribute to an increased risk of forest fires, and illustrate this with a general example showing the mechanism of impact? **[3]**
60. What are the core objectives that guide the management and functioning of biosphere reserves globally? **[3]**
61. Discuss the role of biosphere reserves in mitigating the effects of natural calamities such as floods and coastal erosion. **[3]**
62. Explain how the concept of 'Community Rights' under an indigenous rights framework contributes to the economic sustainability of traditional communities. **[3]**
63. Describe why sustainable tourism is considered essential for protecting natural environments. **[3]**
64. Explain how poor forest management practices, specifically the accumulation of deadwood and overgrown vegetation, contribute to forest fire susceptibility. **[3]**
65. What are the primary benefits that ecotourism offers to both the environment and local populations? **[3]**
66. **Read the given source carefully and answer the questions that follow:** **[4]**

A forest reserve located near a popular hill station began receiving thousands of tourists each year. Initially, tourism increased local incomes and created employment opportunities. However,

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uncontrolled visitor numbers soon led to environmental problems. Plastic waste accumulated along trails, vehicles caused air pollution, and construction of hotels required clearing forest land. Wildlife became disturbed by noise and human activity, leading some species to move away from their natural habitats. Water consumption by tourist facilities increased significantly, reducing water availability for local residents and wildlife. To address these issues, authorities introduced ecotourism practices such as limiting visitor numbers, promoting waste recycling, using solar energy, and training local guides. Educational programmes informed visitors about responsible behaviour. As a result, environmental damage decreased while tourism continued to generate income for local communities. This example demonstrates the importance of balancing tourism development with environmental conservation and sustainable resource management.

Questions:

- Name one environmental problem caused by mass tourism. **(1)**
- How did authorities reduce environmental damage? **(1)**
- Why should visitor numbers be regulated in sensitive ecosystems? **(2)**

67. **Read the given source carefully and answer the questions that follow:** **[4]**

Biomes are large ecological regions that share similar climatic conditions, vegetation, and animal life. Their distribution is mainly controlled by temperature and precipitation, although factors such as latitude, altitude, soil type, and water availability also influence their characteristics. Regions near the Equator receive abundant sunlight and rainfall, resulting in tropical rainforests with dense evergreen vegetation and exceptional biodiversity. Areas with seasonal rainfall often develop tropical grasslands or savannas, where grasses dominate and scattered trees occur. Deserts form in regions with very low rainfall and support drought-resistant vegetation. Temperate forests experience moderate climates with four distinct seasons, while temperate grasslands contain fertile soils that support extensive agriculture. In higher latitudes, the taiga biome is characterised by long, cold winters and coniferous forests. Beyond the taiga lies the tundra biome, where permafrost limits plant growth. Human activities such as deforestation, industrialisation, pollution, and urban expansion increasingly affect natural biomes. These changes can alter vegetation patterns, reduce biodiversity, and disturb ecological balance, making conservation efforts important for maintaining the stability of ecosystems worldwide.

Questions:

a. Which two climatic factors primarily determine the distribution of biomes? **(1)**

b. Name the biome characterised by permafrost. **(1)**

c. How can human activities alter biome characteristics? **(2)**

68. **Read the given source carefully and answer the questions that follow:** **[4]**

Biosphere reserves play a significant role in conserving ecosystems and biodiversity. They provide habitats for countless species of plants, animals, and microorganisms, each contributing to ecological balance. Forests within biosphere reserves act as carbon sinks, absorbing carbon dioxide and helping regulate global temperatures. Wetlands filter water and reduce flooding, while grasslands support numerous herbivores and predators. These protected areas also serve as natural laboratories for scientific research and environmental monitoring. Another important function of biosphere reserves is their role in reducing the impact of natural disasters. Mangroves protect coastlines from storms and rising sea levels, while forests reduce soil erosion

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and landslides. The interconnected relationships among species ensure nutrient cycling, pollination, and food chain stability. If biodiversity declines, ecosystems become less resilient to environmental changes. Therefore, biosphere reserves are not only important for wildlife conservation but also for maintaining ecosystem services that support human survival and economic activities.

Questions:

a. What is one important ecosystem service provided by forests in biosphere reserves? **(1)**

b. How do mangroves help protect coastal regions? **(1)**

c. Why is biodiversity important for ecological balance? **(2)**

69. **Read the given source carefully and answer the questions that follow:** **[4]**

Ecotourism refers to responsible travel to natural areas that conserves the environment and benefits local communities. Unlike mass tourism, which often causes environmental damage, ecotourism focuses on sustainability, conservation, and education. Visitors are encouraged to learn about ecosystems, biodiversity, and local cultures while minimising their environmental impact. Revenue generated from entry fees, guided tours, and eco-friendly accommodations often supports conservation programmes and local livelihoods. Ecotourism creates employment opportunities for local people as guides, forest guards, and hospitality workers. It also promotes awareness about the importance of protecting forests and wildlife. Sustainable tourism practices include waste management, renewable energy use, and responsible visitor behaviour. However, if tourism is poorly managed, it can result in pollution, habitat destruction, wildlife disturbance, and overuse of natural resources. Therefore, planning and regulation are necessary to ensure that tourism contributes positively to environmental protection while supporting economic development for local communities.

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Questions:

a. What is ecotourism? **(1)**

b. Name one economic benefit of ecotourism. **(1)**

c. Why is sustainable tourism important? **(2)**

70. **Read the given source carefully and answer the questions that follow:** **[4]**

The tropical rainforest biome is one of the most diverse ecosystems on Earth. It is mainly found near the Equator in regions such as the Amazon Basin, Congo Basin, and Southeast Asia. These forests experience high temperatures throughout the year, usually ranging between 25°C and 30°C, along with very heavy rainfall exceeding 200 cm annually. The vegetation grows in several layers, creating a dense canopy that blocks sunlight from reaching the forest floor. Despite abundant plant growth, the soil is often nutrient-poor because heavy rainfall washes away minerals. Tropical rainforests provide habitat to countless species, including monkeys, jaguars, parrots, sloths, frogs, and insects. The complex interactions among plants, animals, and microorganisms contribute to exceptional biodiversity. These forests also play an important role in regulating the global climate by absorbing large amounts of carbon dioxide. However, rapid deforestation for agriculture, mining, and urban expansion threatens these ecosystems. Loss of rainforest cover affects biodiversity, contributes to climate change, and disrupts water cycles, highlighting the need for sustainable management and conservation of these valuable ecosystems.

Questions:

a. Where are tropical rainforests mainly located? **(1)**

b. What type of vegetation is found in tropical rainforests? **(1)**

c. Why is deforestation a major threat to tropical rainforests? **(2)**

71. Explain the primary goal of globally recognized protected areas designed to foster a balanced relationship between human societies and the natural environment. Discuss how these areas achieve their objectives of conservation and sustainable development. **[5]**

72. Explain how the destruction of tree cover impacts the soil and water cycle within an ecosystem. **[5]**

73. Explain the concept of 'ecological balance' in the context of forest and wildlife ecosystems. **[5]**

74. Define a biome, outlining its fundamental characteristics and how these units are shaped by environmental factors over extended periods. **[5]**

75. Describe the three core objectives that guide the management and functioning of internationally designated conservation sites, emphasizing their multi-faceted approach to environmental stewardship. **[5]**

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Solution
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1. **(a)** Natural features like forests and wetlands absorb excess water and prevent erosion.
Explanation:
The biosphere reserve provides natural buffers that help mitigate the impact of natural disasters. Forests and wetlands, for example, act as natural barriers that absorb excess water and prevent soil erosion.

2. **(c)** 1976
Explanation:
The first biosphere reserve was established in 1976.

3. **(d)** Hot and humid throughout the year with no distinct dry season
Explanation:
Tropical rainforests are characterized by high temperatures, heavy rainfall, and high humidity throughout the year. They do not experience a distinct dry season, and the climate remains warm and wet in all months. These conditions support dense vegetation, rich biodiversity, and continuous plant growth, making tropical rainforests one of the most productive ecosystems on Earth.

4. **(d)** Nilgiri Biosphere Reserve
Explanation:
The Nilgiri Biosphere Reserve is explicitly identified as the 'First (Oldest) Biosphere Reserve' with a designation year of 1986.

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5. **(d)** UNESCO's Man and the Biosphere (MAB) Programme
Explanation:
UNESCO's Man and the Biosphere (MAB) Programme, launched in 1971, is specifically mentioned as the program recognizing biosphere reserves.

6. **(b)** By ensuring the interconnectedness of organisms, maintaining intact food chains and webs.
Explanation:
The interconnectedness of all organisms within the biosphere reserve ensures that the food chains and webs remain intact, which helps maintain ecological balance.

7. **(b)** Significant temperature fluctuations between day and night
Explanation:
Deserts are known for extreme temperature differences, with very hot days and cold nights, in addition to minimal rainfall.

8. **(c)** To empower Gram Sabhas to conserve and manage community forests.
Explanation:
Community Forest Resource Rights (CFRR) under the Forest Rights Act, 2006 empower Gram Sabhas to protect, regenerate, conserve, and manage community forest resources. These rights recognize the traditional role of forest-dwelling communities in sustainable forest management. CFRR helps

strengthen local self-governance, promotes biodiversity conservation, and ensures that forest resources are used responsibly for the benefit of present and future generations.

9.

(c) Establishment of protected areas
Explanation:
The establishment of protected areas is a conservation measure, not a cause of degradation. The major causes listed are deforestation, illegal hunting and poaching, and habitat loss.

10. **(a)** Deciduous trees that shed leaves seasonally
Explanation:
Temperate forests are characterized by deciduous trees such as oak and maple, which shed their leaves in autumn.

11.

(b) 10,500 sq km
Explanation:
The Gulf of Mannar Biosphere Reserve is listed with an area of '10,500 sq km approximately'.

12.

(c) Tundra biome
Explanation:
The tundra biome is defined by its extremely cold climate, with permafrost (permanently frozen ground) beneath the surface, which restricts vegetation to low-growing forms like mosses, lichens, grasses, and small shrubs.

13. **(a)** Heavy rainfall washing away nutrients
Explanation:
The heavy rainfall characteristic of tropical rainforests leads to leaching, where nutrients are quickly washed away, making the soil thin and less fertile.

14.

(c) Permanently frozen subsoil
Explanation:
The Tundra biome is defined by the presence of permafrost, which is permanently frozen ground beneath the surface.

15. **(a)** Soil erosion
Explanation:
Trees help hold the soil together; without them, soil becomes loose and can be easily washed or blown away, leading to soil erosion.

16.

(c) To ensure long-term availability of resources for future generations.
Explanation:
Sustainable tourism aims to ensure that tourism activities are planned and managed to protect natural resources for future generations.

17.

(d) Education
Explanation:
Forest communities depend on forests for many basic needs such as food, fuel, and shelter. Forests provide fruits, roots, firewood, timber, and other resources essential for daily living. Education, however, is not a direct basic need obtained from forests and is usually provided through schools and

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other educational institutions. Therefore, education is the correct answer as it is not typically listed among the basic needs that forest communities rely on forests to fulfill.

18.

(c) By regulating the amount of water vapour in the atmosphere through transpiration.
Explanation:
Vegetation affects local and global climatic conditions by regulating the amount of water vapour in the atmosphere through the process of transpiration.

19.

(b) To conserve biodiversity while fostering sustainable development.
Explanation:
Biosphere reserves are designated protected areas aimed at conserving biodiversity while promoting sustainable development.

20. **(a)** Climate
Explanation:
Climate, specifically temperature and rainfall patterns, is identified as the most significant factor influencing the distribution and characteristics of biomes because it dictates what types of life can thrive.

21.

(b) It can disrupt processes like pest control or nutrient cycling, leading to a decline in biodiversity.
Explanation:
Every species plays a role in maintaining ecological balance. The loss of any species in an ecosystem can disrupt these processes (e.g., predators controlling herbivores, decomposers recycling nutrients) and lead to a decline in biodiversity.

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22. **(a)** Agricultural practices
Explanation:
Agricultural practices are stated as involving controlled burns to clear land for cultivation, which can lead to uncontrolled forest fires.

23. **(a)** Agri-tourism
Explanation:
Agri-tourism (rural, farm, ranch) is listed as a type of Alternative Tourism, also known as Nature Tourism or Ecotourism.

24.

(d) The International Ecotourism Society (TIES)
Explanation:
The International Ecotourism Society (TIES) is explicitly mentioned as defining ecotourism with the provided statement.

25.

(d) Natural processes that benefit humans and other organisms, such as air purification and nutrient cycling.
Explanation:
Ecosystem services refer to the essential benefits that ecosystems provide, such as air and water purification, climate regulation, soil formation, and nutrient cycling, which are crucial for the survival of all living organisms.

26. **(a)** A-II, B-III, C-I, D-IV
Explanation:

- **Global Recognition** refers to the international acknowledgment and endorsement of protected areas or conservation sites.
- **Sovereign Control** means that the management and authority over these areas remain with the national government.
- **Resource Protection** aims to prevent the overexploitation of natural resources and conserve biodiversity.
- **Scientific Monitoring** involves the continuous observation and assessment of ecological conditions and environmental changes.

Therefore, the correct option is **A-II, B-III, C-I, D-IV.**

27.

(d) A-II, B-I, C-III, D-IV

Explanation:

The core zone is a strictly protected area, aligning with 'Legally protected natural area'. The buffer zone typically surrounds the core and allows for scientific research and environmental education, matching 'Area for research and education'. The transition zone is the outermost area where local communities live and practice sustainable resource use, consistent with 'Human settlements and sustainable resource use'. UNESCO's MAB Programme is a global initiative aimed at fostering a balanced relationship between humans and nature, fitting 'Global initiative for human-nature harmony'.

28.

(c) A-II, B-III, C-I, D-IV

Explanation:

Ecosystem Services include functions like 'Provision of clean air and water'. Habitat Diversity refers to the 'Variety of natural environments'. Ecological Balance is maintained through processes like the 'Maintenance of food webs'. Buffer against Disasters describes 'Natural protection from extreme events'.

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29.

(d) A-III, B-I, C-IV, D-II

Explanation:

Habitat loss refers to the destruction or alteration of natural environments. Reforestation is the act of replanting trees in previously forested areas. Deforestation is the large-scale removal of trees for other land uses. Conservation measures are legal frameworks and actions for resource preservation.

30. **(a)** A-II, B-III, C-IV, D-I

Explanation:

Climate Regulation involves the 'Moderation of atmospheric conditions'. Species Interdependence highlights the 'Reliance of organisms on each other'. Soil Formation refers to the 'Creation of fertile top layer'. Erosion Control is associated with the 'Prevention of soil loss'.

31.

(b) A-II, B-IV, C-I, D-III

Explanation:

Afforestation involves planting trees where no forest existed. Poaching is the illegal hunting of wild animals. A forest fire is an uncontrolled combustion. Wildlife protection laws are for the legal protection of species.

32. **(a)** A-III, B-IV, C-II, D-I

Explanation:

The Man and the Biosphere (MAB) initiative is a human-nature harmony program. A designated protected area represents an area for combined conservation and development. The World Network

of Reserves refers to a global network of conservation sites. A biosphere reserve characteristic is a specific region with notable ecosystems.

33.

(b) A-II, B-I, C-III, D-IV

Explanation:

Climate change contributes to higher fire risks. Early detection involves using technology like satellites to monitor forests. Sustainable use means responsible management of resources. Community participation is local involvement in protection efforts.

34. **(a)** A-III, B-IV, C-I, D-II

Explanation:

National Parks are designated protected areas. Human activities are a primary cause of forest ignitions. Fuel for fires refers to accumulated dead plant material. Prescribed burns are controlled burning techniques to manage vegetation.

35.

(c) A-II, B-III, C-I, D-IV

Explanation:

Research and monitoring involve investigating ecological processes. Environmental education focuses on imparting knowledge on ecological principles. Sustainable resource use pertains to sustaining resource usage for the population. Global importance is linked to the international recognition of conservation areas.

36.

(b) Both A and R are true, but R is not the correct explanation of A

Explanation:

The assertion accurately describes the tundra biome, with its long, frigid winters and permafrost. The reason correctly explains the limited vegetation in the tundra due to the presence of permafrost. Both statements are true. However, the characteristics of the vegetation (R) are a consequence of the harsh climate and permafrost described in A, but they do not explain the climatic conditions (long, frigid winters) or the presence of permafrost itself. Thus, R does not explain A.

37.

(b) Both A and R are true, but R is not the correct explanation of A

Explanation:

The assertion accurately describes a desert biome, characterized by very low rainfall and adapted vegetation. The reason also correctly identifies a common adaptation of desert animals (nocturnality) to avoid high daytime temperatures. Both statements are true. However, the nocturnal behavior of animals (R) is a consequence of the harsh environmental conditions (including heat, which results from low cloud cover often associated with low rainfall), but it does not explain *why* the rainfall is low or *how* plants adapt. Therefore, R is not the correct explanation of A.

38. **(a)** Both A and R are true, and R is the correct explanation of A

Explanation:

The assertion claims vegetated regions influence climate. The reason provides a direct mechanism (transpiration and water vapor release) by which vegetation impacts atmospheric conditions and thus climate. Hence, R correctly explains A.

39. **(a)** Both A and R are true, and R is the correct explanation of A

Explanation:

The assertion is true because habitats provide the necessary resources for species survival. The reason explains why habitat loss is detrimental: species have evolved specific adaptations to their habitats, making them unable to survive elsewhere. Therefore, R is a correct explanation for A.

40. **(a)** Both A and R are true, and R is the correct explanation of A
Explanation:
Ecological corridors directly address habitat fragmentation by allowing species movement and gene flow, which are essential for maintaining biodiversity and the health of populations in isolated patches. Therefore, the reason correctly explains the assertion.
41. Illegal hunting threatens endangered species by reducing their population faster than they can reproduce. It targets animals for their body parts, meat, or trade value, leading to a decline in numbers and loss of genetic diversity. Continued poaching can push already vulnerable species toward extinction and disrupt the ecological balance of their habitats.
42. Designated protected areas with religious or cultural significance, often known as sacred groves, contribute to biodiversity preservation by prohibiting activities like tree cutting and hunting within their boundaries. This creates undisturbed refuges for various species, allowing them to thrive and maintain ecological balance. The cultural reverence associated with these sites ensures their long-term protection.
43. i. Conservation of ecosystems and biological diversity.
ii. Promotion of economic and human development that is environmentally, socially, and culturally sustainable.
44. Unplanned tourism expansion often necessitates clearing natural vegetation for hotels, roads, and other facilities. This directly destroys vital habitats, reduces green spaces, and fragments ecological corridors, making it challenging for numerous species to survive and thrive within their native environments.
45. Variations in altitude create differences in temperature, rainfall, and vegetation, even within a small geographical area. As altitude increases, temperatures generally decrease, leading to distinct environmental conditions at different elevations. These changes support diverse ecological communities, ranging from tropical forests in lower regions to temperate or alpine ecosystems at higher altitudes, despite similar latitudinal locations.
46. Two primary human activities contributing to forest degradation are deforestation (large-scale tree cutting) and illegal hunting/poaching of wildlife.
47. These designated areas provide safe and protected habitats for a wide variety of plants, animals, and microorganisms. By conserving natural ecosystems and reducing human disturbances, they help species survive, reproduce, and maintain healthy populations. Such areas also preserve biodiversity, support ecological balance, and protect endangered species, ensuring the long-term sustainability of natural environments.
48. The three core functions or objectives are:
i. **Conservation:** Protecting biological and cultural diversity, including ecosystems, species, and genetic resources.
ii. **Development:** Fostering economic and human development that is socio-culturally and ecologically sustainable.
iii. **Logistic Support:** Providing support for environmental research, monitoring, education, and information exchange related to local, national, and global issues of conservation and sustainable development.
49. Ecotourism promotes environmental awareness by engaging visitors in educational experiences that highlight biodiversity and the critical necessity of protecting natural ecosystems. This direct immersion helps foster a deeper appreciation and understanding of conservation efforts.
50. Biomes located at similar latitudes often experience comparable climatic conditions, including temperature, rainfall, and seasonal patterns. These factors strongly influence the types of vegetation that can grow and the adaptations animals develop for survival. As a result, regions on different continents but at similar latitudes may exhibit similar ecosystems, plant communities, and animal characteristics.
51. Tourist facilities often consume significant amounts of water, electricity, and fuel. Over-extraction of water in sensitive areas can deplete groundwater levels, while excessive energy use increases pollution and carbon emissions, accelerating environmental harm and resource depletion.
52. The primary purpose of Individual Forest Rights (IFR) is to grant legal entitlement to individuals to hold and reside on forest land for habitation or self-cultivation. This acknowledges their historical occupation

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of these lands, subject to specific conditions and pre-defined occupancy dates.

53. Displacement due to development projects forces forest-dwelling communities to abandon their ancestral lands, severing their deep-rooted ties to the natural environment. This disruption leads to the disintegration of established social structures, as communities are uprooted from familiar territories and support systems. Consequently, their unique cultural traditions and collective identity, which are often intrinsically linked to their specific forest landscape, erode under the pressure of forced relocation and resettlement challenges.
54. The primary goal of this global initiative, known as the World Network of Biosphere Reserves, is to promote a balanced relationship between people and nature. It seeks to conserve biodiversity while supporting sustainable development and scientific research. By encouraging the responsible use of natural resources, it helps protect ecosystems and improve the livelihoods of local communities.
55. Trees play a vital role in regulating atmospheric conditions by absorbing carbon dioxide during photosynthesis and releasing oxygen into the air. This helps reduce the concentration of greenhouse gases, moderates climate change, and improves air quality. Trees also influence local temperature and humidity levels, contributing to a healthier and more balanced environment.
56. This description refers to the tundra biome. It experiences an extremely cold climate with long, harsh winters and very short summers. A defining characteristic is permafrost, where the ground below the surface remains frozen year-round. This condition severely restricts root penetration, leading to limited and low-growing vegetation. Typical plant types include mosses, lichens, grasses, and small shrubs, which are adapted to the cold temperatures, short growing season (only a few weeks), and nutrient-poor soils shallow over the permafrost, preventing the growth of tall trees.
57. Deforestation refers to the extensive removal of forests, often to create land for other uses. Trees play a crucial role in absorbing carbon dioxide from the atmosphere during photosynthesis. When forests are cleared, not only is this natural carbon sequestration process lost, but the carbon stored in the trees is also released back into the atmosphere through decay or burning, thereby increasing greenhouse gas concentrations.
58. Soil characteristics, such as composition and nutrient content, are fundamental to plant growth. Fertile soils rich in organic matter can support a greater density and diversity of plant life, as seen in temperate grasslands. These plants form the base of the food web. Consequently, the type and abundance of plants directly influence the animal populations that rely on them for food and shelter. Therefore, soil indirectly shapes the entire biological community, impacting herbivore populations, and subsequently, their predators, thus defining the biome's faunal composition.
59. Invasive species can heighten forest fire risks, particularly non-native plants that possess high flammability. For instance, certain invasive tree species, distinct from native flora, may contain volatile oils that ignite easily and burn intensely, causing fires to spread more rapidly and intensely than they would in a native ecosystem. This changes the natural fire regime, making forests more susceptible to frequent and severe wildfires even under normal conditions.
60. The core objectives of biosphere reserves are the conservation of biodiversity, the promotion of sustainable development, and the support of scientific research and environmental education. They aim to protect ecosystems, species, and genetic diversity while encouraging the responsible use of natural resources. Biosphere reserves also serve as sites for ecological monitoring and research, helping scientists understand environmental changes. Together, these objectives foster a balanced relationship between human activities and nature.
61. Biosphere reserves help mitigate the effects of natural calamities by protecting ecosystems that act as natural barriers. Forests reduce soil erosion and slow floodwaters by absorbing excess rainfall, while mangroves and coastal vegetation help protect shorelines from storms, tidal surges, and coastal erosion. These reserves also maintain ecological balance and enhance environmental resilience. By conserving natural habitats, biosphere reserves reduce disaster risks and support the long-term safety and well-being of both human communities and wildlife.
62. Community Rights empower local populations to manage and utilize minor forest resources, such as specific non-timber forest products, for their economic benefit. This includes the right to collect, use, and sell these items, as well as access shared resources like grazing lands and water bodies. This

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framework supports traditional livelihoods by providing a legal basis for income generation and resource management, thereby enhancing local economies.

63. Sustainable tourism is essential for protecting natural environments because it minimizes environmental degradation while allowing people to experience natural and cultural sites. It promotes responsible use of resources, reduces pollution, and helps conserve biodiversity and ecosystems. By involving local communities, it ensures economic benefits without overexploitation of nature. Sustainable tourism also raises awareness about conservation and encourages long-term planning, ensuring that natural attractions remain preserved and healthy for future generations.
64. Poor forest management, characterized by a lack of clearing deadwood, fallen trees, and overgrown vegetation, results in an excessive accumulation of combustible material on the forest floor. This organic debris acts as readily available fuel, significantly increasing the intensity and spread potential of any ignition source. Such conditions make forests highly susceptible to fires, turning what might have been a minor burn into a large, uncontrollable wildfire by consistently feeding the flames.
65. Ecotourism benefits the environment by promoting conservation of natural habitats, protecting biodiversity, and reducing pollution through responsible travel practices. It encourages sustainable use of resources and supports the maintenance of ecological balance. For local populations, ecotourism generates income, creates employment opportunities, and improves living standards. It also helps preserve traditional cultures and encourages community participation in conservation efforts. Overall, ecotourism fosters a mutually beneficial relationship between nature conservation and socio-economic development.
66. a. One major environmental problem caused by mass tourism is pollution. Large numbers of visitors generate litter, increase vehicle emissions, and contribute to environmental degradation in forests and protected areas.
    b. Authorities introduced ecotourism measures such as visitor limits, waste recycling, solar energy use, environmental education, and trained local guides. These measures reduced environmental impacts while supporting sustainable tourism.
    c. Regulating visitor numbers reduces pressure on ecosystems, prevents habitat destruction, limits pollution, and protects wildlife from disturbance. It helps maintain ecological balance while allowing tourism activities to continue sustainably.
67. a. Temperature and precipitation are the primary climatic factors that determine biome distribution. Different combinations of heat and rainfall create conditions suitable for specific vegetation and animal communities, resulting in the formation of distinct biomes across the world.
    b. The tundra biome is characterised by permafrost, a permanently frozen layer of soil beneath the surface. It occurs mainly in Arctic regions and supports only low-growing vegetation such as mosses, lichens, grasses, and small shrubs.
    c. Human activities such as deforestation, urbanisation, pollution, and industrial development alter natural habitats and vegetation patterns. These changes reduce biodiversity, disturb food chains, and modify ecosystem functions, which may eventually change the characteristics and distribution of biomes.
68. a. Forests in biosphere reserves act as carbon sinks by absorbing carbon dioxide from the atmosphere. This helps regulate global temperatures, reduce greenhouse gas concentrations, and support climate stability.
    b. Mangroves act as natural barriers against storms, cyclones, and rising sea levels. Their dense root systems reduce coastal erosion, absorb wave energy, and protect nearby human settlements and ecosystems.
    c. Biodiversity ensures that different species perform essential ecological functions such as pollination, nutrient recycling, and population control. A diverse ecosystem is more stable and resilient, allowing it to adapt better to environmental changes and disturbances.
69. a. Ecotourism is responsible travel to natural areas that conserves the environment, supports local communities, and promotes education about nature and biodiversity while minimising negative environmental impacts.
    b. Ecotourism creates employment opportunities for local communities. People can work as guides, forest guards, hospitality staff, or conservation workers, generating income while supporting

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environmental protection.

c. Sustainable tourism protects natural resources and biodiversity while allowing economic benefits. It reduces pollution, prevents habitat destruction, encourages responsible visitor behaviour, and ensures that ecosystems remain healthy for future generations.

70. a. Tropical rainforests are mainly located near the Equator, especially in the Amazon Basin of South America, the Congo Basin of Africa, and Southeast Asia.

b. Tropical rainforests have evergreen broadleaf vegetation with tall trees forming multiple layers and a dense canopy.

c. Deforestation is a major threat because it destroys habitats, reduces biodiversity, disrupts ecological balance, increases carbon dioxide in the atmosphere, and affects rainfall and climate patterns.

71. Primary goal of globally recognized protected areas (like biosphere reserves):
To maintain a balanced relationship between human societies and the natural environment by conserving biodiversity while allowing sustainable use of resources.
These areas achieve this by protecting ecosystems, species, and genetic diversity in core zones, while buffer and transition zones permit regulated human activities. They promote sustainable development through eco-friendly livelihoods, environmental education, and scientific research. Continuous monitoring helps manage ecological changes and ensures that conservation efforts and human needs coexist without degrading natural resources.

72. The destruction of tree cover fundamentally alters the soil and water cycle in an ecosystem. Trees play a critical role in holding soil together with their root systems; without them, soil becomes exposed and loose, making it highly susceptible to erosion by wind and water. This loss of topsoil reduces soil fertility and can lead to desertification. Furthermore, forests regulate rainfall and water flow by absorbing precipitation, releasing it gradually, and contributing to atmospheric moisture through transpiration. Removing trees disrupts this natural process, often leading to increased surface runoff, reduced groundwater recharge, and more extreme hydrological events like floods and droughts.

73. Ecological balance in forest and wildlife ecosystems refers to a stable and self-regulating relationship among living organisms and their physical environment. In forests, plants, herbivores, carnivores, decomposers, soil, water, and climate interact through food chains and nutrient cycles. Each species plays a specific role in maintaining population control and energy flow. Predators regulate herbivore populations, while decomposers recycle nutrients back into the soil. Forests also influence rainfall, soil fertility, and climate conditions. When biodiversity is intact, these interactions remain balanced and ecosystems function smoothly. Disturbances such as deforestation or overhunting can disrupt this balance, leading to species decline and environmental degradation.

74. A biome is a large ecological unit consisting of communities of plants, animals, and microorganisms that share similar environmental conditions and adaptations. It is primarily defined by climate, especially temperature and precipitation, which determine the type of vegetation and animal life that can survive there. Biomes develop over long periods as organisms adapt to these stable climatic conditions and interact with one another. Factors such as latitude, altitude, soil type, and rainfall patterns shape their distribution across the Earth. Examples include deserts, tropical rainforests, grasslands, and tundra. Each biome maintains its own ecological balance, biodiversity, and characteristic life forms influenced by long-term environmental processes.

75. Internationally designated conservation sites, such as biosphere reserves, are guided by three core objectives. The first is conservation of biodiversity, which focuses on protecting ecosystems, species, and genetic diversity. The second is sustainable development, which promotes the responsible use of natural resources while supporting the livelihoods of local communities. The third is logistic support, which includes scientific research, environmental education, and monitoring of ecological changes. Together, these objectives ensure a multi-faceted approach to environmental stewardship by balancing protection of nature with human needs and knowledge creation. This integrated framework helps maintain ecological stability while encouraging sustainable interactions between people and the environment.

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