



Sambhav-2023

Day 96

Question 1: What do you understand by biodiversity? Also discuss the measurement of the biodiversity. (150 words)

Question 2: The deep-sea mining can extinct the yet unknown species of the marine ecosystem. Discuss the preventive and protective measures that can be taken for sustainable sea-bed mining. (250 words)

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Approach / Explanation / Answer

Answer 1

Approach

- Give a brief introduction about biodiversity.
- Discuss the measurement of biodiversity.
- Write a holistic and appropriate conclusion.

Introduction

- Biodiversity refers to the variety of life on Earth, including the different species of plants, animals, and microorganisms, as well as the genetic diversity within these species, and the variety of ecosystems in which they live.
- Biodiversity is crucial to the healthy functioning of ecosystems, providing benefits such as clean air and water, food and medicine, and regulating the climate.
- However, human activities such as habitat destruction, pollution, and climate change are causing a significant loss of biodiversity worldwide.

Body

Measurement of the Biodiversity

- Measuring biodiversity is essential to understanding the current state of biodiversity and tracking changes over time.
- One of the most common ways to measure biodiversity is by assessing species richness, which is the number of different species present in a particular area.
- Species evenness, which refers to the relative abundance of each species, is another measure of biodiversity. Other measures include genetic diversity and ecosystem diversity.

- In addition to measuring the number of species, scientists also assess the ecological roles and relationships of different species in an ecosystem, as well as the functional diversity of species.
- Functional diversity refers to the range of traits and functions that different species perform in an ecosystem, such as pollination, nutrient cycling, and pest control.
- Measuring these different aspects of biodiversity provides a more comprehensive understanding of the state of ecosystems.

Biodiversity can also be measured at different levels, including genetic diversity, species diversity, and ecosystem diversity:

- **Genetic diversity:** This refers to the variety of genetic information present within a species. Genetic diversity is important for adaptation and evolution and can be measured by assessing the variability in genetic markers such as DNA sequences or proteins.
- **Species diversity:** This refers to the variety of different species present in an ecosystem. Species diversity can be measured using different metrics such as species richness (the number of different species present) or species evenness (the relative abundance of different species).
- **Ecosystem diversity:** This refers to the variety of different habitats and ecosystems present in an area. Ecosystem diversity can be measured by assessing the number and distribution of different types of ecosystems such as forests, wetlands, or grasslands.

Conclusion

Measuring biodiversity is important for understanding the state of ecosystems and for developing strategies for their conservation and management. Biodiversity assessments can be conducted at different scales, ranging from local to global, and can involve different methods such as field surveys, DNA analysis, or remote sensing. Overall, measuring biodiversity is a complex task that requires a multidisciplinary approach, involving ecologists, geneticists, taxonomists, and other specialists.

Answer 2

Approach

- Give a brief introduction about deep-sea mining.
- Discuss the preventive and protective measures for sustainable seabed mining.
- Write a holistic and appropriate conclusion.

Introduction

- Deep-sea mining is the process of extracting valuable minerals and resources from the ocean floor, specifically from depths of over 200 meters.
- The minerals that are targeted for extraction include copper, nickel, cobalt, gold, manganese, and rare earth elements, among others.
- These minerals are found in high concentrations in deep-sea hydrothermal vents, seamounts, and polymetallic nodules.

Body

- There are concerns that deep-sea mining could lead to the extinction of yet unknown species of the marine ecosystem.
- The deep sea is one of the least explored regions of the planet, and new species are regularly discovered in this environment.
- Many of these species are believed to have unique adaptations to the extreme conditions found in the deep sea, such as high pressure, low light, and cold temperatures.
- The mining process can also release sediment and chemicals into the water, which could have a negative impact on existing species and ecosystems.

Sustainable sea-bed mining is an important goal for the mining industry, and there are several preventive and protective measures that can be taken to ensure that deep-sea mining is carried out in a responsible

and sustainable manner. Here are a few examples:

▪ **Environmental Impact Assessments (EIAs):**

- One of the most important measures for sustainable sea-bed mining is conducting comprehensive EIAs.
- These assessments should identify and evaluate the potential environmental impacts of mining activities, including the potential impacts on marine ecosystems, habitats, and species.
- This information can be used to develop measures to prevent or mitigate these impacts.

▪ **Development of Best Practices and Guidelines:**

- Industry organizations and regulatory bodies can develop best practices and guidelines for sustainable sea-bed mining.
- These practices can include recommendations on how to minimize the impacts of mining activities on the marine environment, such as limiting the size of the mining area, avoiding sensitive areas, and reducing the amount of sediment and chemicals released into the water.

▪ **Monitoring and Control Measures:**

- Regular monitoring of the mining activities and the marine environment can help to ensure that environmental impacts are minimized.
- Monitoring can be conducted using underwater vehicles, cameras, and sensors.
- Control measures can be implemented, such as shutting down mining activities if environmental impacts are observed or thresholds are exceeded.

▪ **Rehabilitation and Restoration:**

- Once mining activities have ceased, rehabilitation and restoration efforts can be undertaken to restore the seafloor and promote the recovery of the marine environment.
- This can include measures such as replanting marine vegetation, restoring habitats, and monitoring the area to ensure that it is recovering properly.

▪ **International Regulation and Cooperation:**

- International regulation and cooperation are essential for sustainable sea-bed mining.
- Governments can work together to establish international treaties and agreements to ensure that mining activities are conducted in a responsible and sustainable manner.
- This can include the establishment of protected areas, the monitoring of mining activities, and the sharing of scientific knowledge.

Conclusion

These are just a few examples of the preventive and protective measures that can be taken for sustainable sea-bed mining. By implementing these measures, it is possible to ensure that deep-sea mining is carried out in a responsible and sustainable manner, with minimal impact on the marine environment.

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