FAQ's

What is biodiversity?

- **Biodiversity** is the variability among living organisms from all sources, including terrestrial, marine, and other aquatic **ecosystems** and the ecological complexes of which they are part; this includes **diversity** within **species**, between species, and of ecosystems.
- Biodiversity forms the foundation of the vast array of **ecosystem services** that critically contribute to human **well-being**.
- Biodiversity is important in human-managed as well as natural ecosystems.
- Decisions humans make that influence biodiversity affect the well-being of themselves and others.

Biodiversity is the foundation of **ecosystem services** to which human **well-being** is intimately linked.No feature of Earth is more complex, dynamic, and varied than the layer of living organisms that occupy its surfaces and its seas, and no feature is experiencing more dramatic change at the hands of humans than this extraordinary, singularly unique feature of Earth. This layer of living organisms—the biosphere—through the collective metabolic activities of its innumerable plants, animals, and microbes physically and chemically unites the atmosphere, geosphere, and hydrosphere into one environmental system within which millions of species, including humans, have thrived. Breathable air, potable water, fertile soils, productive lands, bountiful seas, the equitable climate of Earth's recent history, and other ecosystem services) are manifestations of the workings of life. It follows that large-scale human influences over this biota have tremendous impacts on human well-being. It also follows that the nature of these impacts, good or bad, is within the power of humans to influence.

Discuss the concept and types of biodiversity.

Concept of Biodiversity:

It has been estimated that more than 50 million species of plants, animals and micro-organisms are existing in the world. Out of these, about 1.4 million species have been identified so far. Each species is adapted to live in specific environment, from mountain peaks to the depth of seas, from polar ice caps to tropical rain forests and deserts. All this diversity of life is confined to only about one kilometer thick layer of lithosphere hydrosphere and atmosphere which form biosphere.

Though the study of environment and ecology is quite old, the term biodiversity has been introduced by Walter Rosen in 1986. Biological diversity or Biodiversity is defined as the variety and variability among the living organisms and the ecological complexes in which they occur.

It refers to the variability's among species of plants, animals and microorganisms; ecosystems; ecosystem including terrestrial, aerial, marine and other aquatic system and ecological complexes of which they are part. In simpler terms, biodiversity is the assemblage of different life forms

If reflects the number of different organisms and their relative frequencies in an ecological system. It includes the organisation of organisms at many levels ranging from complete ecosystems to the chemical components that form the molecular basis of heredity. Thus, biodiversity is sum of all the genes, varieties, species, populations in different ecosystems and their relative abundance.

Scientists are aware of the immense potentials of various life-forms existing on the earth. Our planet's requirements and services depend mainly on the biological resources. Biological resources not only provide us nourishment, clothing, housing, fuel and medicine but also meet our several other requirements. Therefore the knowledge of

biodiversity is of immense utility in planning sustainable livelihood and conserving the natural resources.

Types of Biodiversity:

Biodiversity is of three types:

1. Species diversity

2. Genetic diversity

3. Ecological diversity

Discuss two types of biodiversity in detail.

1. Species Diversity:

According to Biological Species Concepts (BSC), species is a basic unit of classification and is defined as a group of similar organisms that interbreed with one another and produce offspring's and share a common lineage. Species diversity refers to biodiversity at the most basic level and is the 'variety and abundance of different types of individuals of a species in a given area'. It includes all the species on Earth, ranging from plants such as bacteria, viruses, fungi, algae, bryophytes, pteridophytes, gymnosperms, angiosperms and all the species of animals including unicellular protozoans to mammals.

Certain regions support a more diverse populations than others. Regions that are rich in nutrients and have well balanced climatic factors, such as moderate temperature, proper light and adequate rainfall, show high degree of diversity in their life forms. The tropical areas support more diverse plant and animal communities than the desert and polar areas, as for examples, tropical forest has a higher species diversity as compared to a timber plantation. The regions that are rich in species diversity are called hotspots of biodiversity.

2. Genetic Diversity:

'Genetic diversity pertains to the range of diversity in the genetic resources of the organisms'. Every individual member of a plant or animal species differs from other individuals in its genetic constitution. Each individual has specific characters, which is due to the genetic makeup or code. The genes present in the organisms can form infinite number of combinations that causes genetic variability.

Thus, we find that each human, who is representative of the same species, i.e. Homo sapiens, is distinct from another. Similarly, there are many varieties within the same species such as rice, wheat, apples, mangoes, etc. that differ from one another in shape, size, colour of flowers and taste of fruits and seeds due to the variations at the genetic level.

The term 'gene pool' has been used to indicate the genetic diversity in the different species .This also includes the diversity in the wild species, which through intermixing in nature over millions of years have given rise to newer varieties. The domesticated varieties of agricultural crops and animals have also evolved from the wild gene pool.

The genetic variability is essential for healthy breeding population, the reduction in genetic variability among breeding individuals leads to inbreeding which in turns can lead to extinction of species. In the recent decades, a new science named 'biotechnology' has emerged. It manipulates the genetic materials of different species through various genetic re-combinations to evolve better varieties of crops and domestic animals.

***Discuss any two biodiversity hot spots in India*.**

1)The Western Ghats

About the region: The Western Ghats are a chain of hills that run along the western edge of peninsular India. Their proximity to the ocean and through orographic effect,

they receive high rainfall. These regions have moist deciduous forest and rain forest. The region shows high species diversity as well as high levels of endemism. Nearly 77% of the amphibians and 62% of the reptile species found here are found nowhere else.

Biodiversity: There are over 6000 vascular plants belonging to over 2500 genera in this hotspot, of which over 3000 are endemic. Much of the world's spices such as black pepper and cardamom have their origins in the Western Ghats. The highest concentration of species in the Western Ghats is believed to be the Agasthyamalai Hills in the extreme south. The region also harbors over 450 bird species, about 140 mammalian species, 260 reptiles and 175 amphibians. Over 60% of the reptiles and amphibians are completely endemic to the hotspot. Remarkable as this diversity is, it is severely threatened today. The vegetation in this hotspot originally extended over 190,000 square kms. Today, its been reduced to just 43,000 sq. km

2)The Eastern Himalayas

About the region: The Eastern Himalayas is the region encompassing Bhutan, northeastern India, and southern, central, and eastern Nepal. The region is geologically young and shows high altitudinal variation. Together, the Himalayan mountain system is the world's highest, and home to the world's highest peaks, which include Mount Everest and K2. Some of the world's major river systems arise in the Himalayas, and their combined drainage basin is home to some 3 billion people (almost half of Earth's population) in 18 countries. The Himalayas have profoundly shaped the cultures of South Asia; many Himalayan peaks are sacred in Hinduism, Buddhism and Sikhism.

Biodiversity: The Eastern Himalayan hotspot has nearly 163 globally threatened species including the One-horned Rhinoceros (*Rhinoceros unicornis*), the Wild Asian Water buffalo (*Bubalusbubalis (Arnee)*) and in all 45 mammals,

50 birds, 17 reptiles, 12 amphibians, 3 invertebrate and 36 plant species The Relict Dragonfly (*Epiophlebialaidlawi*) is an endangered species found here with the only other species in the genus being found in Japan. The region is also home to the Himalayan Newt (*Tylototritonverrucosus*), the only salamander species found within Indian limits.The Himalayas are home to over 300 species of mammals, a dozen of which are endemic. Mammals like the Golden langur, The Himalayan tahr, the pygmy hog, Langurs, Asiatic wild dogs, sloth bears, Gaurs, Muntjac, Sambar, Snow leopard, Black bear, Blue sheep, Takin, the Gangetic dolphin, wild water buffalo, swamp deer call the Himalayan ranged their home.