

BT101 – ECOLOGY, BIODIVERSITY & EVOLUTION – I

MIDTERM IMPORTANT QUESTIONS

Q-1 How pollution is classified?

Pollution can be classified by its physical nature, by its source, by its recipient, by the sector affected or by its effects. Pollution may be in the form of a gas, liquid, solid or energy. ... There are different types of pollution: water pollution, air pollution, solid waste pollution and noise pollution.

Q-2 What are k selected species and r selected species?

The two evolutionary "strategies" are termed r-selection, for those species that produce many "cheap" offspring and live in unstable environments and K-selection for those species that produce few "expensive" offspring and live in stable environments.

Q-3 Differentiate between homology and analogy.

In biology, homology is the resemblance of the arrangement, physiology, or growth of various species of organisms. In biology, an analogy is a functional similarity of structure, based on the similarity of use and not upon common evolutionary origins. Due to different structures, they do not have similar functions.

Homologies are traits present in two or more organisms that were inherited from the common ancestor of those organisms. The human five-fingered hand and the five-toed foot of a lizard, for example, were both inherited from our common ancestor that lived more than 300 Mya

Analogy, in biology, similarity of function and superficial resemblance of structures that have different origins. For example, the wings of a fly, a moth, and a bird are analogous because they developed independently as adaptations to a common function—flying.

Q-4 Write characteristics of thermosphere.

- Temperature increase with altitude due to absorption of highly energetic solar radiation.
- Temperature can raise 1700 °C or more.
- Highly diluted gas in this layer can reach 2,500 °C during the day.

Q-5 What is Aposematism?

Aposematism is the advertising by an animal to potential predators that it is not worth attacking or eating. This unprofitability may consist of any defences which make the prey difficult to kill and eat, such as toxicity, venom, foul taste or smell, sharp spines, or aggressive nature.

Q-6 What are invasive species?

Colonization, a natural process by which a species expands its geographic range, occurs in many ways.

Examples:

- o Seed dispersal by birds
- o Lowering of sea levels join two isolated land masses
- o Flooding

Types of invasive species

a) Animals

b) Plants

c) Pathogens

- They cause an imbalance in the natural environment.
- They outcompete the native species.

Q-8 Define extinction and its causes.

Extinction is the termination of a kind of organism or of a group of kinds, usually a species. The moment of extinction is generally considered to be the death of the last individual of the species, although the capacity to breed and recover may have been lost before this point.

Humans can cause extinction of a species through overharvesting, pollution, habitat destruction, introduction of invasive species (such as new predators and food competitors), overhunting, and other influences. Explosive, unsustainable human population growth is an essential cause of the extinction crisis.

Q-9 What are water pollutants?

Water pollution is the contamination of water bodies, usually as a result of human activities. Water bodies include for example lakes, rivers, oceans, aquifers and groundwater. ... For example, releasing inadequately treated wastewater into natural water bodies can lead to degradation of aquatic ecosystems.

- Nutrients Pollution. Some wastewater, fertilizers and sewage contain high levels of nutrients.
- ...
- Surface water pollution. ...
- Oxygen Depleting. ...
- Microbiological. ...
- Suspended Matter. ...
- Chemical Water Pollution. ...
- Oil Spillage.

Q-10 Define aestivation.

Cessation or slowing of activity during the summer; especially slowing of metabolism in some animals during a hot or dry period is called aestivation.

Q-11 What is the The University of Wisconsin-Madison restoration ecology?

The University of Wisconsin–Madison Arboretum has pioneered restoration ecology.

- a. The restoration of the prairie was at an early stage in November 1935.
- b. The prairie as it looks today. This picture was taken at approximately the same location as the 1935 photograph.

Q-12 Explain grazer and browser?

Different herbivores make use of different plant parts. Some eat grass and other herbaceous plants and are known as ‘grazers’. Others eat different parts of woody vegetation and are known as ‘browsers’. They feed on non-grass plant material such as leaves, soft shoots, twigs, fruits, and woody plants such as shrubs. Examples: Goats, deer, giraffe, elephants.

Q-13 What is acid rain?

Acid rain is rain or any other form of precipitation that is unusually acidic, meaning that it has elevated levels of hydrogen ions. Most water, including drinking water, has a neutral pH that exists between 6.5 and 8.5, but acid rain has a pH level lower than this and ranges from 4–5 on average.

Sulfur dioxide (SO₂) and nitrogen oxides (NO_x) released into the air by fossil-fuel power plants, vehicles and oil refineries are the biggest cause of acid rain today.

Q-14 What is ground water?

Groundwater is the water present beneath Earth's surface in soil pore spaces and in the fractures of rock formations. A unit of rock or an unconsolidated deposit is called an aquifer when it can yield a usable quantity of water.

Q-15 What is transcription?

Transcription is the process of copying a segment of DNA into RNA. The segments of DNA transcribed into RNA molecules that can encode proteins are said to produce messenger RNA. Other segments of DNA are copied into RNA molecules called non-coding RNAs. mRNA comprises only 1–3% of total RNA samples.

Q-16 What is top down effect and bottom up effect?

Top-down' means that species occupying the highest trophic level (top carnivores) exert a controlling influence on species at the next lower level (their prey) and so forth down the trophic ladder."

The bottom-up effect means that a lower trophic level in the biological network affects the community structure of higher trophic levels by means of resource restriction. Bottom-up model says that the influence on community organization flows from the nutrients, to the vegetation, then the herbivores, and finally the predators.

Q-17 What are vestigial organs and how are they associated with evolution?

A vestigial organ is a term used for organs which are degenerated, underdeveloped or useless for an organism. Examples of vestigial organs in humans usually include the appendix, the coccyx (tail bone), and the tonsils. Body hair, wisdom teeth, nipples on males, nictitating membrane of eye, tonsils are also the vestigial organs of humans.

Vestigial structures are homologous to fully functioning structures inherited by related lineages. Thus, they provide strong evidence of common ancestry and can help us trace the evolutionary origin of the species with the vestigial structures. For example: Dewclaws.

Q-18 Explain primary and secondary treatment of fresh water?

Primary Treatment: consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment.

Secondary Treatment: is a treatment process for wastewater (or sewage) to achieve a certain degree of effluent quality by using a sewage treatment plant with physical phase separation to remove settle able solids and a biological process to remove dissolved and suspended organic compounds.

Q-19 Explain Carbon cycle in detail.

The carbon cycle is the biogeochemical cycle by which carbon is exchanged among the biosphere, pedosphere, geosphere, hydrosphere, and atmosphere of the Earth. Carbon is the main component of biological compounds as well as a major component of many minerals such as limestone.

- Carbon is main component of living organisms.
- 20% of human body is carbon by weight.
- CO₂ is major source of carbon.
- Atmosphere contains about 750 billion metric tons of carbon in form of CO₂
- CO₂ released in air is again available for plants
- In aquatic ecosystem, CO₂ reacts with the water to form bicarbonate ions
- Dissolved CO₂ and bicarbonates are used by algae and aquatic plants in photosynthesis.

Q-20 Explain feeding level of food chain.

- Food energy passes through different sequence.
- Example: plants → grass hopper → frog → snake → hawk
- Many plant species eaten by insects
- Many insects' species eaten by frogs
- This complexity is organized by ecologists.
- Recognized limited number of feeding or trophic levels In Food Chain

- Food energy passes through different sequence.
- Level 1: Primary producer Level 2: Primary consumer Level 3: Secondary consumer Level 4: Tertiary Consumer Level 5: Apex Predator

Q-21 Explain secondary productivity of ecosystem.

The production of organic matter by the consumers is called secondary productivity. In secondary productivity, the energy is obtained by the transfer of energy through the food chain.

Q-22 Explain Paleontology.

Paleontology, also spelled palaeontology or palæontology, is the scientific study of life that existed prior to, and sometimes including, the start of the Holocene epoch. It includes the study of fossils to classify organisms and study their interactions with each other and their environments. Palaeontology is the study of prehistoric species, mostly ones that are extinct. It focuses primarily on fossil data, using a variety of physical, chemical and biological techniques to analyse them.

Q-23 What are types of autotrophs?

An autotroph or primary producer is an organism that produces complex organic compounds using carbon from simple substances such as carbon dioxide, generally using energy from light or inorganic chemical reactions. There are two types of autotrophs: photoautotrophs and chemoautotrophs. Photoautotrophs get their energy from sunlight and convert it into usable energy (sugar). This process is called photosynthesis.

Q-24 What is biogeography?

Biogeography is the discipline of biology that studies the present and past distribution patterns of biological diversity and their underlying environmental and historical causes.

Q-25 What is light pollution?

Light pollution, also known as photo pollution

- Excessive, misdirected or obtrusive artificial light
- Major side-effect of urbanization
- It is blamed for compromising health, disrupting ecosystems and spoiling aesthetic environments.

Q-26 What is role of microorganisms in nitrogen fixation?

Two kinds of nitrogen-fixing bacteria are recognized. The first kind, the free-living (nonsymbiotic) bacteria, includes the cyanobacteria (or blue-green algae) *Anabaena* and *Nostoc* and genera such as *Azotobacter*, *Beijerinckia*, and *Clostridium*. The role of nitrogen-fixing bacteria is to supply plants with the vital nutrient that they cannot obtain from the air themselves. Nitrogen-fixing microorganisms do what crops can't – get assimilative N for them. Bacteria take it from the air as a gas and release it to the soil, primarily as ammonia.

Q-27 What are autotrophs?

An autotroph is an organism that can produce its own food using light, water, carbon dioxide, or other chemicals. Because autotrophs produce their own food, they are sometimes called producers. Plants are the most familiar type of autotroph, but there are many different kinds of autotrophic organisms.

Q-28 Explain Logistics Growth population.

Logistic Population Growth

- Carrying capacity of environment affect population growth
- Environmental resistance
- Growth rate gets smaller as approaches the carrying capacity

Environmental factors affect population growth.

- ☐ Climate
- ☐ Food
- ☐ Space
- ☐ Competition.

Q-29 Name types of parasites.

Types of Parasites

- o Microparasites: reproduce inside host Bacteria, viruses
- o Macroparasites: release juvenile outside host E.g. trematodes
- o Endo parasites Liver fluke, tape worm, nematodes
- o Ectoparasites Ticks, mites, fleas, mosquito, lice

Q-30 Explain theory of inheritance.

The Boveri–Sutton chromosome theory is a fundamental unifying theory of genetics which identifies chromosomes as the carriers of genetic material. It correctly explains the mechanism underlying the laws of Mendelian inheritance by identifying chromosomes with the paired factors required by Mendel's laws.

Boveri and Sutton's chromosome theory of inheritance states that genes are found at specific locations on chromosomes, and that the behavior of chromosomes during meiosis can explain Mendel's laws of inheritance.