Unit 3: Biodiversity

Short Questions

1. How many kinds of organisms are present on the earth? Text Book Page # 31

Ans: The earth is inhabited by at least 10 million kinds of organisms, but less than one-third of these have been studied and catalogued (put in record) by biologists.

2. Name the principal groups of organisms.

Ans: Following are the principal groups of organisms:

- Prokaryotes
- Protists
- Fungi
- Plants
- Animals

3. Define biodiversity. (LHR 2014, SWL 2014, FSD 2014, BWP 2015)

Ans: Definition:

"The measure of the variety of organisms present in different ecosystems is called biodiversity."

- It refers to variety within species and among species.

Meaning:

The term 'Biodiversity' has been derived from two terms,

'bio' – Life

'diversity' – variety

4. What do you mean by flora and fauna?

Ans: Flora:

"The diversity of plants in a particular region is called Flora."

Fauna:

"The diversity of animals in a particular region is called Fauna."

5. On what factors the flora and fauna of a region depend?

Ans: The flora and fauna in a region depend on:

- Climate
- Altitude
- Soils
- Presence of other species
-

6. How biodiversity is distributed on earth?

Ans: Biodiversity is not distributed evenly on Earth,

Tropics:
It is richest in the tropics.
Temperate Regions:
Temperate regions also have many species.
Polar Regions:
Polar regions have fewer species.

7. How biodiversity has evolved?

Ans: Biodiversity found on earth today is the result of 4 Billion years of evolution.

8. What do you know about the origin of life on earth?

Ans: The origin of life is not well known to science, though limited evidence suggests that until 600 million years ago, all life consisted of bacteria and similar unicellular organisms.

9. Describe the importance of biodiversity. **Text Book Page # 32**
(LHR 2015, 2016, MTN 2015)

Ans: The biodiversity is important in many ways.

(i) Food:
Biodiversity provides food for humans.

(ii) Drugs:
A significant proportion of drugs are derived directly or indirectly from biological sources.

(iii)Industrial materials:
A wide range of industrial materials, e.g. building materials, fibers, dyes, resins, gums, adhesives, rubber, and oil are derived directly from plants.

(iv)Maintenance of Ecosystems:
Biodiversity plays an important role in making and maintaining ecosystems.

(v) Environmental Benefits:
It helps in regulating the chemistry of our atmosphere and water supply.

(vi)Recycling:
Biodiversity is directly involved in recycling of nutrients and providing fertile soils.

10. How many types of animals and plants are known to biologists?

Ans: Over **1.5 million** types of animals and over **0.5 million** types of plants are known to biologists.

11. Why does it become difficult to learn about the characteristics of each species?
Text Book Page # 33

Ans:

- Living organisms range in complexity from small and simple bacteria to large and complex human beings.
- Some of them live in sea, others on land. Some walk, others fly. And still others are stationary.
- Each has its own way of life, i.e. getting food, avoiding unfavorable environmental conditions, finding a place to live, and reproducing its kind.

12. How would you differentiate between systematics and taxonomy?
(BWP 2014, RWP 2014)

Ans: The branch of biology which deals with classification of organisms is called Taxonomy whereas the branch of biology which deals with classification and also traces the evolutionary history of organisms is called Systematics.

13. What are the aims of classification?
(MTN 2015, LHR 2013, 2014, DGK 2014, SWL 2015)

Ans: Following are the aims of classification:

- To determine similarities and differences among organisms so that they can be studied easily.
- To find the evolutionary relationships among organisms.

14. What do you mean by Taxa and Taxonomic hierarchy? (MTN 2015)

Ans: "The groups into which organisms are classified are called as Taxa."

- The singular of 'Taxa' is 'Taxon'.

Example:
The largest Taxon is kingdom
Taxonomic Hierarchy:
The Taxa form a ladder, called as 'Taxonomic Hierarchy'.

15. In which species the criteria of interbreeding cannot be used? Text Book Page # 34

Ans: The criteria of interbreeding cannot be used for species recognition in organisms who reproduce asexually and do not interbreed with one another.

Example:

- Many unicellular organisms

16. Write the classification of human being. (LHR 2015, DGK 2014)

Ans:

Taxa	**Human**
Kingdom	Animalia
Phylum	Chordata
Class.....	Mammalia
Order.....	Primates
Family.....	Hominidae
Genus.....	*Homo*
Specie.....	*H.Sapiens*

17. Write the classification of pea plant. (LHR 2012)

Ans:

Taxa	**Pea**
Kingdom	Plantae
Phylum.....	Magnoliophyta
Class.....	Magnoliopsida
Order.....	Fabales
Family.....	Fabaceae
Genus.....	*Pisum*

Specie..... *P.sativum*

18. Define specie?

Ans: "A group of organisms which can interbreed freely among them and produce fertile off springs, but are reproductively isolated from all other groups in nature is called as species."

Example:

- Human Beings

19. What is Mule? **Text Book Page # 35**

Ans: In the definition of species, we must emphasize "in nature" because two organisms related to two different but closely related species can cross-breed under artificial conditions. But in such unnatural crosses they produce an infertile offspring.

A cross between a male donkey and female horse produces an infertile offspring called Mule

20. What is contribution of Aristotle in classification of living organisms?

Text Book Page # 36

Ans: The earliest known system of classification of organisms comes from the Greek philosopher Aristotle. He classified all living organisms known at that time in two groups:

- Plantae
- Animalia

21. Describe contribution of following scientists for classification of living organisms.

(i) Ibn Rushd (ii) Augustus Rivinus (iii) Andrea caesalpino

Ans:

(i) Ibn Rushd (Averroes):

In 1172, Ibn Rushd translated Aristotle's book 'de Anima' (On the Soul) in Arabic.

(ii) Augustus Rivinus:

He introduced the taxon of 'order'.

(iii) Andrea Caesalpino:

He divided plants into fifteen groups and called them 'genera'.

22. What do you know about classification system By Carolus Linnaeus? (LHR 2012)

Ans: He grouped species according to similar physical characteristics and he divided nature into three kingdoms:

(i) Mineral
(ii) Vegetable
(iii) Animal

He used five ranks in classification:

(i) Class
(ii) Order
(iii) Genus
(iv) Species
(v) Variety

Linnaeus is best known for his introduction of the method still used to formulate the scientific name of every species.

23. Why two kingdom classification system was rejected?

Ans: Some taxonomists found this system unworkable because:

- Many unicellular organisms like *Euglena* have both plant like (presence of chlorophyll) and animal-like (heterotrophic mode of nutrition and lack of cell-wall) characters. So there should be a separate kingdom for such organisms.
- This system also ignores the difference between organisms having prokaryotic and those having eukaryotic cells.

24. Who proposed three-kingdom classification and what were the problems with kingdom system? **Text Book Page # 37**

Ans: **Introduction:**

In 1866, Earnst Hackel solved the first objection and presented three-kingdom classification system.

Objections:

- This system did not clear the difference between prokaryotes and eukaryotes.
- **Fungi** were still placed in the **Kingdom Plantae.** Some biologists disagreed about the position of Fungi in kingdom Plantae. Fungi resemble plants in many ways but are not autotrophs. They are special form of heterotrophs and get their food by absorption. They do not have cellulose in their cell walls, rather they possess Chitin.

25. What is the role of E-Chatton?

Ans: In 1937, E-Chatton suggested the terms of 'Procaryotique' to describe bacteria and 'Eucariotique' to describe animal and plant cells

26. What is the basis of five-kingdom classification system? (BWP 2015, RWP 2014)

Ans:

(i) Cellular organization:

The levels of cellular organization, i.e. prokaryotic, unicellular eukaryotic and multi-cellular eukaryotic.

(ii) Modes of nutrition:

The principle modes of nutrition, i.e. photosynthesis, absorption and ingestion.

27. How would you differentiate between organisms of kingdom fungi and animalia?

Ans:

ANIMALS	FUNGI
• Animals have ingestive mode of nutrition. • Animals lack cell wall. • Animals are not decomposers.	• Fungi have absorptive mode of nutrition. • Fungi contain cell wall composed of chitin. • Most fungi are decomposers.

28. What type of organisms are included in kingdom Monera? Give Examples.

(BWP 2015)

Ans: Kingdom Monera:

It includes prokaryotic organisms i.e. they are made of prokaryotic cells. Monerans are unicellular, although some types form chains, clusters, or colonies of cells. Most are heterotrophic but some perform photosynthesis.

Examples:

- Bacteria
- Cyanobacteria

29. Write down two characteristics of kingdom protista. (DGK 2015)

Ans: Kingdom protista:

- It includes eukaryotic unicellular and simple multicellular organisms.
- These organisms may be photosynthetic are heterotrophic.

30. Write two characteristics of kingdom fungi?

Text Book Page # 38(FSD 2015, SGD 2015)

Ans: Kingdom Fungi:

- It includes eukaryotic multicellular heterotrophs which are absorptive in their nutritional mode.
- They live on organic material, secrete digestive enzymes and absorb small organic molecules.

Examples:

Mushrooms

31. Describe two characteristics of kingdom plantae. (GRW 2014)

Ans: Kingdom Plantae:

- It includes eukaryotic multicellular autotrophs.
- They have multicellular sex organs and form embryos during their life cycles.

Examples:

Mosses, ferns and flowering plants are included in kingdom plantae.

32. How can you divide five kingdoms into two groups on the basis of types of cells?

Ans: Five kingdoms can divided into two groups on basis of types of cells in following ways:

(i) Kingdom Monera (organisms with prokaryotic cells)

(ii) Kingdom protista, fungi, plantae, animalia (organisms with eukaryotic cells)

33. What are prions and viroids? Text Book Page # 39 (GRW 2014, SWL 2015)

Ans: Prions and viroids are acellular forms of organisms. Both of these particles cause infectious diseases in certain plants. They are not included in five-kingdom classification.

Prions:

They are composed of proteins only.

Viroids:

They are composed of circular RNA only.

34. Clarify that viruses are living or non-living? (LHR 2016, RWP 2015)

Ans: Viruses are at the borderline of living and non living. They have both non living and living features which distinguish their unique identity.

Non-Living Feature:

- Due to their crystalline nature they are considered as non living.
- They are acellular i.e. they do not have cellular organization.

Living Features:

- They contain DNA or RNA normally encased in a protein coat.
- They reproduce, but only in living cells.
- They cause a number of diseases in living cells.

Conclusion:

They are not considered as organisms and thus are not assigned any place in the five-kingdom classification system.

35. Define binomial nomenclature. (GRW 2015, MTN 2014, SWL 2015)

Ans: Introduction:

Binomial nomenclature is the method of giving scientific names to living organisms.

Meaning:

'bi-nomial' means "two names"

Format:

As the word "binomial" suggests, the scientific name of a any living organism consists of two names: the first is the **genus** name and the second one is the name of the **species.**

Example

The Scientific name of human beings is *Homo sapiens*.

36. State any two rules for suggesting scientific names to living organisms.

Text Book Page # 40

Ans: Some of the rules which are universally adopted while suggesting and documenting scientific names, are:

- Scientific names are usually printed in *italics*, such as *Homo sapiens*. When handwritten, they are underlined.
- The first term (generic name) always begins with a capital letter.

37. What are the problems with common names of living organisms?

Ans: Common names have no scientific basis.

Example:

A fish is a vertebrate animal with fins and gills. But several common names do not fit a biologist's definition of fish like:

- Silver fish
- Cray fish
- Jelly fish
- Star fish

38. Write down scientific names of following. (MTN 2015)

(a) Onion (b) Starfish (c) House crow (d) Orchid tree

Ans:

Onion	_ _ _ _ _ _ _ _ _ _ _ _	*Allium cepa*
Starfish	_ _ _ _ _ _ _ _ _ _ _ _	*Asterias rubens*
House crow	_ _ _ _ _ _ _ _ _ _ _ _	*Corvus splendens*
Orchid tree	_ _ _ _ _ _ _ _ _ _ _ _	*Bauhinia variegate*

39. Define Extinct species. Text Book Page # 41 (GRW 2013)

Ans: "In an ecosystem, a species is called extinct when there is no doubt that the last individual of that species has died in that ecosystem."

Example:

Dinosaurs

40. What are endangered species? Give examples.

(LHR 2012, GRW 2013, 2015, SGD 2014, FSD 2015)

Ans: A species is called endangered when it is at risk of extinction in near future.

Examples:

Indus dolphin, Marco Polo sheep, Houbara bustard.

41. Write a short note on *Eucalyptus* plants. Text Book Page # 42

Ans: *Eucalyptus* plants were imported from Australia and introduced in Pakistan. These plants consume more water and have disturbed the water table (level of underground water). It harms other small plants that grow near *Eucalyptus* trees.

42. What is the effect of deforestation on biodiversity?

Text Book Page # 43 (LHR 2016, GRW 2013)

Ans: Effects of deforestation:

Deforestation affects the amount of water in soil and moisture in atmosphere. When there are no trees to keep soil in place, there are more chances of soil erosion. Essential nutrients are washed out of soil. Rivers become choked up with mud and silt, which can cause floods. Deforestation also reduces the sources of rains.

43. What is the role of over-hunting in extinction? Text Book Page # 44 (LHR 2015)

Ans: Over-hunting has been a significant cause of the extinction of hundreds of species and the endangerment of many more such as whales, ibex, urial, markhor (the national animal of Pakistan) etc. Commercial hunting, both legal and illegal, is the principal threat.

44. What are the main causes of loss of biodiversity in Pakistan?

Ans: Pakistan today faces severe threats to its animal and plant species. The main causes of this loss are:

- Loss of natural habitats
- Rapid growth in human population
- Prevailing poverty in rural areas
- Low literacy rate

45. Which organizations are working for the conservation of biodiversity?

Ans: The following organizations are working for the conservation of biodiversity in Pakistan.

- The International Union for the Conservation of Nature and Natural Resources (IUCN)
- World Wildlife Fund Pakistan (WWF-P)
- Pakistan's Ministry of Environment
- Other government and non-government institutions

46. Which organization has prepared first red list of Pakistan?

Ans: The IUCN has prepared the first national Red List (list of endangered or threatened species).

47. Write names of animals to which Northern Areas provide habitat.

Text Book Page # 45

Ans: The Northern Areas of Pakistan provide habitats:

- Musk deer
- Snow leopard
- Astore markhor
- Himalayan ibex
- Woolly Flying squirrel
- Brown bear

48. How many migratory birds are killed each year?

Ans: It is estimated that about 200,000 of the one million migratory birds passing through Chitral are killed during migration.

49. What herders do with bear cubs?

Ans: The herders capture the bear cubs and sell them to the trainers who train them and sell them to the foreigners.

50. Write a short note on Houbara Bustard. **Text Book Page # 46 (LHR 2013)**

Ans: This bird flies to Pakistan in winter season from former Soviet territory and settles in Cholistan and Thar deserts. The decline in its population is due to hunting by foreigners and destruction of its habitats.

51. Name the national animal and bird of Pakistan.

(LHR 2013, SWL 2014, RWP 2015)

Ans: **National Animal:**

Markhor is the national animal of Pakistan.

National Bird:

Chakor patridge is the national bird of Pakistan.