DIVERSITY IN LIVING ORGANISMS

1. What are the advantages of classifying organisms? (or) Why do we classify organisms?

A. **Advantages of classifying organisms:**

i) It makes the study of living organisms easy.

ii) It helps to know the relationships among various groups of organisms.

iii) It provides information about plants and animals, which occur in specific geographical regions.

iv) It helps in scientific research.

v) It helps us to know about evolutionary relationship in different groups of organisms.

vi) It helps in understanding the evolution of organisms.

vii) It helps in placement of different organisms in a definite taxonomic group.

2. Give three examples of the range of variations that you see in life forms around you.

A. **Examples for the range of variations in life forms around us are:**

i) Range of life span - Turtles live for hundreds of years, whereas fruit flies die in few hours.

ii) Range of colours - Life ranges from colourless worms to colourful flowers and birds.

iii) Range of site - Some bacteria are visible only under microscope while blue whales are about 50 meters.

3. How would you choose between two characteristics to be used for developing a hierarchy in classification?

A. i) For developing a hierarchy of classification, we choose the fundamental characteristics among several other characteristics.

ii) By choosing the basic or fundamental characteristics, we can make broad divisions in living organisms as the next level of characteristics are dependent on these. This goes on to form a hierarchy of characteristics.

iii) For example, plants differ from animals in many ways such as body design, photosynthesis, the absence of locomotion, chloroplasts, cell wall, etc. But, out of these, only locomotion is considered as the basic or fundamental feature that is used to distinguish between plants and animals.

4. Explain the basis for grouping organisms into five kingdoms.

A. Robert.H. Whittaker in 1959 proposed a five-kingdom classification.

The basis for grouping organisms into five kingdoms is as follows:

i) On the basis of the presence or absence of membrane-bound organelles, all living organisms are divided into two broad categories eukaryotes and prokaryotes. This division leads to the formation of kingdom Monera, which includes all prokaryotes.

ii) Then, eukaryotes are divided as unicellular and multicellular, on the basis of cellularity. Unicellular eukaryotes form kingdom Protista, and multicellular eukaryotes form kingdom Fungi, Plantae, and Animalia.

iii) Animals are then separated on the basis of the absence of a cell wall.

iv) Since fungi and plants both contain a cell wall, they are separated into different kingdoms on the basis of their modes of nutrition. Fungi have saprophytic mode of nutrition, whereas plants have autotrophic mode of nutrition. This results in the formation of five kingdoms.

5. What are the major divisions in the Plantae? What is the basis for these divisions? Explain briefly.

A. The kingdom Plantae is divided into five main divisions. They are Thallophyta, Bryophyta, Pteridophyta, Gymnosperms, and Angiosperms.

The classification of plants depends on the following criteria:

i) Differentiated or Undifferentiated plant body

ii) Presence / absence of vascular tissues

iii) With / without seeds

iv) Naked seeds / seeds inside fruits

6. How are the criteria for deciding divisions in plants different from the criteria for deciding the subgroups among animals?

A. **The criteria for deciding divisions in plants are:**

i) Differentiated / undifferentiated plant body.

ii) Presence / absence of vascular tissue.

iii) Do not produce seeds (pteridophyte) / produce seeds (phanerogams).

iv) Bear naked seeds (Gymnosperms) / Bear seeds inside the fruits (Angiosperms).

v) Have seeds with two cotyledons (dicots) / have seeds with one cotyledon (monocots).

The criteria for deciding subgroups among animals are:

i) Cellular level organisation / Tissue level organisation.

ii) Presence / absence of body cavity and pseudocoelomate.

iii) Presence of body layers (blasticity) (diploblastic and triploblastic)

iv) Symmetry (Asymmetrical, Radial symmetry, Bilateral symmetry etc.)

v) Presence / absence of Notochord and presence of vertebral column.

7. Explain how animals in Vertebrata are classified into further Subgroups.

A. Animals of vertebrates are classified mostly on the basis of their skeletal system, general environmental adaptations, and reproductive system.

Vertebrates are grouped into five classes:

i) PISCES ii) AMPHIBIA iii) REPTILIA

iv) AVES v) MAMMALIA