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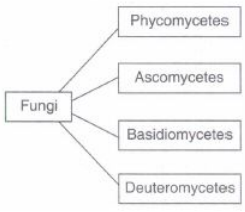
Answers Key:

Case Study Questions

1. (i) Cyanobacteria are generally surrounded by gelatinous sheath. They form blooms in polluted water bodies.
   (ii) Some cyanobacteria can fix nitrogen in a specialised cells called heterocysts, e.g. Nostoc.
   (iii) Cyanobacteria are unicellular, colonial or filamentous, freshwater/marine or terrestrial algae.
   (iv) Cyanobacteria have chlorophyll-a similar to green plants.
   (v) Due to the presence of chlorophyll-a in cyanobacteria. These are also called photosynthetic autotrophs.
2. (i) Cauliflower mosaic virus contains RNA instead of DNA.
   (ii) It surrounds the genetic material. It is proteinaceous. It is composed of several capsomeres.
   (iii) Poliomyelitis virus is polyhedral in shape.
   (iv) Tobacco Mosaic Virus (TMV).
3. (1) b.Phycomycetes
   (2) a.Presence of asci
   (3) Gametes, which exhibits same morphological feature are termed as anisogamous gametes.
   (4) Ustilago is commonly known as smut fungi.
   (5) Fungi belongs to phylum ascomycetes, produces sac like structure called asci, which are involved in production of ascospores. This the reason Ascomycetes are commonly called as sac-fungi.

5 Marks

4. Three Domains system or six Kingdom classification is a biological classification system in which living organisms were divided based on cellular characteristics. Carl Woese in 1990 introduced it.
   The three domains are
   (i) **Archaea** It contains prokaryotic organisms, which have a monolayer core of lipids in the cell membrane and distinct nucleotides in their 16 RNA.
   (ii) **Bacteria** It contains typical prokaryotes, which lack membrane covered cell organelles but do not have a type of microchambers for separating various activities.
   (iii) **Eukarya** This domain contains eukaryotic organisms, originated by endosymbiotic association between some archaebacteria and eubacteria. It have four kingdoms-Protista, Plantae, and Animalia.
5. Two kingdom classification was unable to accommodate certain living beings as they neither had properties of animals nor of plants.Through two kingdom classification it was not possible to include every set of characters in a particular kingdom.
   Five kingdom classification could accommodate more set of characters.As a result it was easier to categorize all living beings.
   For example bacteria can be autotrophic as well as heterotrophic.It was a difficult question to categorize them either under plant or animal.A separate kingdom was the most logical choice.
   Similarly, viruses are a borderline case between living and non-living.When they don,t get host then they behave like a non-living.Once, inside a host they spring to life. Although the five kingdom classification does not have room for virus but it opened the way for a better and more inclusive system of classification.
6. **Division of Kingdom Fungi :**
   The morphology of the mycelium, mode of spore formation and fruiting bodies form the basis for the division of the kingdom into various classes.
   a) Phycomycetes :
   Habit and Habitat : Members of phycomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants.
   Mycelium : The mycelium is aseptate and coenocytic.
   Reproduction : Asexual reproduction takes place by zoospores (motile) or by aplanospores (non-motile).



   b) Ascomycetes :
   Habit and Habitat : Commonly known as sac-fungi,the ascomycetes are unicellular, e.g.yeast (Sacharomyces) or multicellular, e.g.Penicillium.They are saprophytic, decomposers, parasitic or coprophilous (growing on dung).
   Mycelium : Mycelium is branched and septate.
   Reproduction : The asexual spores are conidia, produced exogenously on the special mycelium called conidiophores.
   c) Basidiomycetes :
   Habit and Habitat : Commonly known forms of basidiomycetes are mushrooms, bracket fungi or puffballs. They grow in soil, on logs and tree stumps and in living plant bodies as parasites, e.g., rusts and smuts.
   Mycelium : The mycelium is branched and septate.
   Reproduction : The asexual spores are generally not found, but vegetative reproduction by fragmentation is common.
   d) Deuteromycetes :
   Habit and Habitat : Some members are saprophytes or parasites while a large number of them are decomposers of litter and help in mineral cycling. Some

examples are Alternaria, Colletotrichum and Trichoderma.

Reproduction : The deuteromycetes reproduce only by asexual spores known as conidia. The mycelium is septate and branched.

7. There are millions of species on this planet.The largest phylum Arthropoda alone comprises of millions of species. To study all of them properly we need some system for categorizing them, based on some common characteristics.
Apart from that think of the differences in language and you will find different names for the same species in different languages.In the absence of a system of nomenclature it would have been difficult to share scientific knowledge among the scientists of different nations.
To make things easier and systematic the need for classification was felt.Earlier attempts by people like Aristotle segregated living beings into plants and animals.This was good point to start with, but there are certain living beings which do not fit in either of plants or animals.So a three kingdom classification was devised.The three kingdom classification was used for some time.But as none of the scientific theory is permanent so further discoveries led to creation of a five kingdom classification.The five kingdom classification is the most accepted system of classification.

8.

	Kingdom Animalia	**Kingdom Plantae**
Locomotion	Have locomotion and they can move from one place to another.	Don't have any locomotion
Nutrition	Heterotrophic (Holozoic/ Saprophytic etc.)	Autotrophic, Partially heterotrophic (parasites)
Growth	Grows up to certain age only	Grows throughout their lifetime
Response to stimuli	Shows response to many stimuli (light, heat , pressure, smell)	Shows response only to certain stimuli (light, touch)
Egestion	Through the anus or the mouth.	Through the stomata of leaves and lenticels of stems

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3 Marks

9. **Lichen:**
1. It signifies a symbiotic relationship between the algae and fungi.
2. In this association, the fungi provide shelter and protection to algae and in return get nutrition from algae.

Phycobiont and mycobiont:
1. They both are the components of a lichen.
2. Phycobiont signifies the algal component of a lichen.
3. On the other hand, mycobiont signifies the fungal constituent of a lichen.

10. cyanobacteria have the following harmful effects.
(i) They discolour the walls and roofs of buildings
(ii) Excessive growth in water bodies decreases oxygen levels, There by killing aquatic animals

11. Archaebacteria are able to tolerate high temperature ae well as high acidity.
These bacteria are chemoautotrophic which obtain energy for synthesis of food by oxidising suphur. Under anaerobic conditions they oxidise sulphur to sulpuric acid.
$2S + 2H_2O + 3O_2 \rightarrow 2H_2SO_4$
Thermoacidophiles are able to tolerate high temperature as well as acidity, due to the presence of temperature as well as acidity due to the presence of
(i) branched chain lipids in the cell membranes.
(ii) special resistant enzymes capable of operating under aerobic conditions.

12. **(a) Amoeboid Protozoans :** They are found in fresh water, sea water or moist soil. They have pseudopodia, like amoeba, hence the name amoeboid protozoa. Example : Entamoeba.
(b) Flagellated Protozoans : They have flagella for movement. They are either free living or parasitic. Example : Trypanosoma.
(c) Ciliated Protozoans : They are aquatic. They have thousands of cilia present all over the body. The cilia helps in locomotion and steering of food into the gullet. Example : Paramecium.
(d) Sporozoans : Many protozoans have an infectious spore-like stage in the life cycle. The spore-like stage helps them get transferred from one host to another host. Example : Plasmodium.

13. Nucleus is not well defined in prokaryotes, which means that genetic materials are not enclosed in a capsule.
Nucleus is well defined in eukaryotes, which means that genetic materials are enclosed in a capsule.

14. (a) Aristotle attempted a more scientific basis for classification.
(b) He classified plants into trees, shrubs and herbs.
(c) He classified animals into two groups:
(i) those which have red blood and
(ii) those without red blood.

15. (a) Some bacteria are autotrophs, i.e., they synthesise their own organic food or ATP from inorganic substances; they are of two types:
(i) They may be photosynthetic autotrophs and use light energy to synthesise their food.
(ii) They may be chemosynthetic autotrophs, which oxidise some inorganic compounds and use the energy released for the synthesis of their food.
(b) Many are heterotrophs, i.e. they do not synthesise their food, but depend on an external source; they are of two types:

(i) Some are parasites and depend on living organisms for their food.
(ii) Some are saprotrophs and depend on dead am' decaying organic matter for food.

16. Objectives of classification are
(i)To identify and describe all possible types of species.
(ii) To arrange the species into categories based on their similarities and dissimilarities.
(iii) To help in easy identification of organisms.
(iv) To evolve a natural or phylogenetic system, which should indicate origin and evolution of species.

17. Criteria used to classify fungi are
(i) Morphology and appearance of fungus
(ii) Life-cycle
(ii) Types of spores and their dispersal
(iv) Physiology and biochemistry

18. Although the two are vastly different from each other. They still bear some common characters, on the basis of which they are introduced in Eubacteria of kingdom-Monera.
These characters are as follows :
(i) Both the groups do not possess well-defined nucleus.
(ii) Nucleus lacks nucleolus and nuclear membrane.
(ii) DNA (genetic material) lies freely in the cytoplasm.
(iv) They possess 70S type of ribosomes.

19.

Basidiomycetes	Ascomycetes
In basidiomycetes, basidiospores are produced exogenously on basidium.	In ascomycetes, ascospores are produced endogenously inside the ascus.
They produce basidiospores.	They produce ascospores and conidia.
Basidiomycetes reproduce asexually by either budding or spore formation.	They reproduce asexually by forming conidia.
Example: Agaricus and Puccinia.	Example: Yeast, cupfungi, Penicillium

20. Symbiotic association between algae and fungi is called as lichen. There is physiological intimacy between algae and fungi in lichen. In lichen the algal component provides organic food to the fungal component, in exchange the fungal component, makes water and mineral available to the alga. Besides, the fungal component also protects alga from descication.

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2 Marks

21. Algae, Bryophytes, pteridophytes, gymnosperms and angiosperms.
22. Body organisation in members of Kingdom-Animalia is cellular, tissue, organ and organ system level.
23. The saprotrophic Basidiomycetes can decompose plant matter because they have enzymes for metabolising both cellulose and lignin.
24. Trichoderma, is a soil fungus used in biological control of other fungi as it produces allelochemicals against them. If this fungus passes into human alimentary canal, it produces leukopenia called alimentary canal aleukia.
25. Viroids are free RNA molecules of low molecular weight without any protein coat while viruses can have either RNA or DNA molecules encapsulated in a protein coat. Viroids are smaller in size than viruses. Viroids infect only plants whereas virus infects all types of organisms. In viroids, a protein coat is absent whereas in viruses a protein covering or a coat called a capsid is present around the genetic material.
26. Ernst Haeckel in 1866 proposed three kingdom system of classification, i.e., Plantae, Protista and Animalia. The new kingdom was Protista that included the organisms that lack the capability of tissue differentiation.
27. **Features of Euglenoids :**
i) No cell wall
ii) Protein rich layer, called pellicle, which makes flexible body
iii) Two flagella of different lengths
iv) Autotrophs in sunlight, heterotrophs in the absence of sunlight.
v) Pigmens are identical to that of higher plants.
vi) Example: Euglena
28. Bacteria, cyanobacteria and fungi included in plant Kingdom in the earlier classification systems because the earliest classification system used only gross superficial morphological characters such as habit, colour, number and shapes of leaves .
29. In diatoms the cell walls form two thin overlapping shells, which fit together as in a soap box. The walls are embedded with silica and that is why the walls are indestructible.
30. In five kingdom classification, there was no place of the acellular organism like viruses, viroids and lichens.
31. (a) (i) The intervening condition, is a dikaryon.
(ii) It is the dikaryophase.
(b) (i) Lichens and
(ii) Mycorrhizae.
32. (i) They are non-cellular.
(ii) They have an inert crystalline structure outside the living host cell.