Chapter-2 : Biological Classification

1. (c)
2. (a) Before 1969, all the organisms had been divided into two groups— plants and animals, mainly on the basis of presence or absence of cell wall. Linnaeus (Father of taxonomy) classified all organisms into two kingdoms — Kingdom Plantae and Kingdom Animalia in his two kingdom system of classification.
3. (c) 4. (c)
5. (c) Virus (L. poison) is a non-cellular, infectious, nucleoprotein entity enclosed within a protein covering or coat. It is able to utilise the synthetic machinery of a living cell of another organism for its multiplication which does not involve growth and division. They have either RNA or DNA as genetic material, but never both. Virus is an obligate parasite and is inert outside the host cell. An inert virus outside host is called virion. It can be crystallised and stored indefinitely. A biosynthetic machinery is absent.
6. (d)
7. (a) On the basis of number of flagella and their arrangement, bacteria are categorised into four groups:
   Peritrichous bacteria – bacteria with flagella projecting from entire surface in all directions, e.g., *E. coli*
   Atrichous bacteria – bacteria without flagella, e.g., *Lactobacillus*
   Monotrichous bacteria – bacteria with a single flagellum, e.g., *Vibrio cholerae*
   Amphitrichous bacteria – bacteria with single flagellum at each end, e.g., *Nitrosomonas*
8. (b)
9. (d) In the five kingdom classification of Whittaker, there is no mention of lichens and some acellular organisms like viruses, viroids and prions.
10. (a)
11. (b) Slime moulds are saprophytic protists and do not have chlorophyll. They are surrounded by the plasma membrane only (somatic parts are without cell walls). The slime moulds live usually amongst decaying vegetation and are quite common on lawns and moist fields. They exhibit wide range of colouration. They have phagotrophic or saprotrophic nutrition. Parasitic forms are not known (Bold *et al*, 1987). Both asexual and sexual modes of reproduction are found. They produce spores within sporangia. A spore possesses a cell wall of cellulose.
12. (b) 13. (c)
14. (a) Phycomycetes (Lower or Algal fungi) are characterised by aseptate coenocytic hyphae. Asexual reproduction occurs by zoospores or aplanospores produced endogenously inside sporangia. Sexual reproduction is isogamous or heterogamous. Heterogamous reproduction is of two types, anisogamous and oogamous. Phycomycota or Phycomycetes is divisible into two groups, oomycetes and zygomycetes.
15. (b) Viroids are the smallest self replicating infectious RNA particles which are devoid of protein coat. They are obligate parasites. They are known to cause diseases in plants only *e.g.,* potato spindle tuber disease. Virus is a non-cellular, infectious, nucleoprotein entity enclosed within a protein covering or coat. It is able to utilise the synthetic machinery of a living cell of another organism for its multiplication which does not involve growth and division. They have either RNA or DNA as genetic material, but never both. Virus is an obligate parasite and is inert outside the host cell. An inert virus outside host is called virion. It can be crystallised and stored indefinitely. A biosynthetic machinery is absent. Bacteriophage are viruses that infect the bacteria. They contain double stranded DNA.
16. (d) 17. (b) 18. (c) 19. (a)
20. (c) In a bacterial cell, membrane bound cell organelles as found in eukaryotes are absent. Various structures present in the cytoplasm of a prokaryotic cell include mesosomes, 70S ribosomes, nucleoid, plasmids, gas vacuoles, food reserve, etc.
21. (d) Prion was discovered by Prusiner in 1983 for the first time.They are highly resistant glycoprotein particles which function as infectious agents. They are formed due to mutation in gene *PRNP*. Prions can also act as catalyst and convert normal protein into prion state. Prions are not affected by proteases, nucleases, temperature upto 800°C, UV radiations and formaldehyde.
22. (a) Lichens (coined by Theophrastus) are composite or dual organisms which are formed by a fungus partner or mycobiont (mostly ascomycetes) and an algal partner (mostly blue green algae). Fungus forms the body of lichen as well as its attaching and absorbing structures. Algae perform photosynthesis and provide food to the fungus.
23. (a)

24. **(c)** Viruses can pass through bacteria-proof filters and are found to be smaller than bacteria.

25. **(d)**

26. **(a)** In many members of basidiomycetes, cell division is accompanied by clamp connection. These are bridge (hook) like connections and function as bypass hyphae through which nuclei migrate to make all of mycelium dikaryotic.

27. **(a)** In some fungi, the fusion of two haploid cells immediately results in diploid cells (2n). However, in other fungi such as ascomycetes and basidiomycetes, an intervening stage in which two nuclei per cell occurs. This condition is called a dikaryon and the phase is called dikaryophase of fungus.

28. **(b)** Archaebacteria are a group of prokaryotic organisms including the methanogens, which produce methane; the thermoacidophilic bacteria, which live in extremely hot and acidic environments, & the halophilic bacteria, which can only function at high salt concentrations. These bacteria share some characteristics with eubacteria but differ in some ways from other forms of life, e.g., their cell wall lacks peptidoglycan which is present in the cell wall of eubacteria. The lipids present in plasma membrane of archaebacteria are not like those present in membranes of eubacteria or eukaryotes.

29. **(d)** *Mucor* is a member of zygomycetes (the conjugation fungi) in which motile cells e.g., zoospores, planogametes, etc. are absent. Asexual reproduction takes place by the formation of non-motile mitospores called sporangiospores. Sexual reproduction takes place by the formation of non-motile zygospores.

30. **(c)** In Whittaker's five kingdom system of classification, eukaryotes are distributed among four kingdoms: Protista, Plantae, Fungi and Animalia. Kingdom Monera includes all prokaryotes *e.g.,* mycoplasma, bacteria, actinomycetes and cyanobacteria (blue green algae).

31. **(d)** Deuteromycetes is an artificial class of fungi which has been created to include all those fungi in which sexual state is either absent or not known. Asexual reproduction often occurs by conidia alongwith some other types of spores. In some cases even asexual spores are absent. *Ustilago* is the member of basidiomycetes.

32. **(d)** Euglenoids are unicellular flagellate protists commonly found in fresh water ponds, pools and moist mud. They lack cellulosic cell wall. The body is covered by thin and flexible pellicle (= periplast). The pellicle has oblique but parallel stripes called myonemes. The euglenoids have two flagella, usually one long and one short. Though the euglenoids are photosynthetic in the presence of light, when deprived of sunlight they behave like heterotrophs by predating on smaller organisms (holozoic) or feeding on organic remains (saprobic). Such a mode of nutrition is called mixotrophic (*i.e.,* a mix of holophytic + saprobic or holozoic). Photosynthetic pigments of euglenoids are identical to those present in higher plants, *e.g.,* chl ***a*** and chl ***b***.

33. **(b)** Bacterial plasma membrane or plasmalemma has a structure similar to that of a typical membrane. It is made of a phospholipid bilayer with proteins of various types (extrinsic, integral, transmembrane). Archaebacteria are a group of most primitive prokaryotes which are able to survive in extremely hostile conditions. Their cell membranes are different from eubacteria and are characterised by the presence of a monolayer of branched chain lipids.

34. **(d)** The class basidiomycetes includes those members that produce their basidia and basidiospores on or in a basidiocarp. Commonly known forms of basidiomycetes are mushrooms, bracket fungi or puffballs, bird's nest fungi (includes species of genera *Crucibulum*, *Cyathus*, etc.).

35. **(b)** **36.** **(b)**

37. **(d)** *Penicillium* belongs to ascomcycetes. In majority of ascomycetes, the common mode of asexual reproduction is through the formation of conidia (singular-conidium). Conidia are non-motile fungal mitospores which are produced exogenously from the tips and sides of hyphae called conidiophores.

38. **(a)** In majority of ascomycetes, the common mode of asexual reproduction is through the formation of conidia (singular–conidium). Conidia are non-motile fungal mitospores which are produced exogenously from the tips and sides of hyphae called conidophores. Conidia are often coloured-brown, green, blue or pink. They provide colouration to the fungus, e.g., *Penicillium*, *Aspergillus*.

39. **(c)** Some members of class deuteromycetes are saprophytes or parasites while a larger number of them are decomposers of litter and help in mineral cycling. Some examples are *Alternaria*, *Colletotrichum* and *Trichoderma*.

40. **(c)** Zoospores are motile asexual spores produced endogenously in sporangium.

41. **(b)**

42. **(c)** Zoospores are motile asexual spores and aplanospores are non-motile asexual spores. These spores are produced endogenously in sporangium.

43. **(c)** W.M. Stanley showed that viruses can be crystallised. Robert Harding Whittaker was a distinguished American plant ecologist. He was the first to propose the five-kingdom taxonomic classification of the world's biota into the Animalia, Plantae, Fungi, Protista, and Monera in 1959. M.W. Beijerinck demonstrated that extract of the infected plants of tobacco could cause infection in healthy plants so called the fluid as *contagium vivum fluidum*. Theodor Otto Diener discovered the viroid, a plant pathogen one fiftieth of the size of the smallest viruses.

44. (b) Whittaker grouped all prokaryotic organisms under Kingdom Monera, the unicellular eukaryotic organisms in Kingdom Protista and multicellular eukaryotic organisms in Kingdoms Fungi, Plantae and Animalia.

45. (d) *Leishmania donovani* is a flagellated protozoan.

46. (a) Monera kingdom includes prokaryotes – mycoplasma, bacteria, actinomycetes and cyanobacteria or blue green algae. Alongwith fungi, they are decomposers and mineralisers of the biosphere.
Protists are mostly aquatic single-celled eukaryotes, therefore, they are found in the sea, fresh water and moist soil. Many protists are found in water bodies in the form of plankton. Some protists live in the bodies of animals as parasites.

47. (a) *Alternaria* belongs to class Deuteromycetes, which lack sexual reproduction. Asexual reproduction takes place by conidia produced on conidiophores.

48. (d)

49. (c) *Agaricus* (mushroom), toadstool and *Puccinia* (rust fungus) are members of basidiomycetes whereas *Alternaria* belongs to class deuteromycetes.

50. (c) The environment was becoming oxygen-rich. There was not a switch from aerobic to anaerobic metabolism but was vice versa.

51. (a) Morels are ascomycetes with edible ascocarps that have fleshy sponge-like conical cap or pileus and a stalk like stipe, *e.g., Morchella esculenta* (vern. Gucchi), *M. crassipes*, *M. deliciosa*. Truffles are edible ascomycetes with tuber-like subterranean ascocarps that are often dug out with the help of trained dogs and pigs, *e.g., Tuber uncinatum*, *T. aestivum*.

52. (b) In basidiomycetes such as mushrooms, sex organs are absent. During sexual reproduction, two vegetative or somatic cells of different strains or genotypes fuse and plasmogamy occurs. The resultant structure is dikaryotic which ultimately gives rise to basidium. Karyogamy and meiosis take place in the basidium producing four basidiospores.

53. (d) **54. (b)**