2 Biological Classification

Trend Analysis with Important Topics & Sub-Topics

Topic	Sub-Topics	2020		2019		2018		2017		2016	
		Qns.	LOD	Qns.	LOD	Qns.	LOD	Qns.	LOD	Qns.	LOD
Five Kingdom Classification	Diversity in the Living World										
Monera	Habitat							1	E		
	Glycocalyx							1	A		
	Mycoplasma							1	E		
Protista	Protozoa					1	A				
	Algae					1	E				
	Diatoms					1	A				
	Members									1	A
Fungi	Pseudopodia					1	A				
	Cell-Wall									1	E
	Members									1	A
Viruses and Viroids	Genetic Material	1	A					1	A		
	Outer Membrane			1	A					1	A
Lichens											

LOD - Level of Difficulty **E - Easy** **A - Average** **D - Difficult** **Qns - No. of Questions**

Topic 1: Five Kingdom Classification

1. Pick up the wrong statement *[2015 RS]*
   (a) Protista have photosynthetic and heterotrophic modes of nutrition
   (b) Some fungi are edible
   (c) Nuclear membrane is present in Monera
   (d) Cell wall is absent in Animalia
2. Five kingdom system of classification suggested by R.H. Whittaker is **not** based on: *[2014]*
   (a) Presence or absence of a well defined nucleus.
   (b) Mode of reproduction.
   (c) Mode of nutrition.
   (d) Complexity of body organisation.
3. In the five-kingdom system of classification, which single kingdom out of the following can include blue green algae, nitrogen-fixing bacteria and methanogenic archaebacteria? *[1998, 2003]*
   (a) Fungi (b) Plantae
   (c) Protista (d) Monera
4. In five kingdom system, the main basis of classification is *[2002]*
   (a) structure of nucleus
   (b) mode of nutrition
   (c) structure of cell wall
   (d) asexual reproduction
5. A system of classification in which a large number of traits are considered, is *[1999]*
   (a) artificial system
   (b) synthetic system
   (c) natural system
   (d) phylogenetic system
6. Phylogenetic classification is based on *[1994]*
   (a) utilitarian system
   (b) habits
   (c) overall similarities
   (d) common evolutionary descent
7. Artificial system of classification was first used by
   (a) Linnaeus (b) De Candolle *[1989]*
   (c) Pliny the Elder (d) Bentham and Hooker

8. System of classification used by Linnaeus was *[1989]*
   (a) natural system
   (b) artificial system
   (c) phylogenetic system
   (d) asexual system
9. Classification given by Bentham and Hooker is *[1988]*
   (a) artificial (b) natural
   (c) phylogenetic (d) numerical

Topic 2: Monera

10. One scientist cultured Cladophora in a suspension of Azotobacter and illuminated the culture by splitting light through a prism. He observed that bacteria accumulated mainly in the region of : *[2019]*
    (a) Blue and red ligh
    (b) Violet and green light
    (c) Indigo and green light
    (d) Orange and yellow light
11. Match the organisms in column I with habitats in column II. *[2019]*

Column-I	Column-II
(A) Halophiles	(i) Hot springs
(B) Thermoacidophiles	(ii) Aquatic environment
(C) Methanogens	(iii) Guts of ruminants
(D) Cyanobacteria	(iv) Salty areas

Select the correct answer from the options given below :
(a) (A)-(ii), (B)-(iv), (C)-(iii), (D)-(i)
(b) (A)-(iv), (B)-(i), (C)-(iii), (D)-(ii)
(c) (A)-(i), (B)-(ii), (C)-(iii), (D)-(iv)
(d) (A)-(iii), (B)-(iv), (C)-(ii), (D)-(i)

12. Which among the following is not a prokaryote? *[2018]*
    (a) Saccharomyces (b) Mycobacterium
    (c) Oscillatoria (d) Nostoc
13. Which of the following are found in extreme saline conditions? *[2017]*
    (a) Eubacteria (b) Cyanobacteria
    (c) Mycobacteria (d) Archaebacteria
14. Which of the following components provides sticky character to the bacterial cell? *[2017]*
    (a) Nuclear membrane (b) Plasma membrane
    (c) Glycocalyx (d) Cell wall
15. Which among the following are the smallest living cells, known without a definite cell wall, pathogenic to plants as well as animals and can survive without oxygen? *[2017]*
    (a) *Pseudomonas* (b) *Mycoplasma*
    (c) *Nostoc* (d) *Bacillus*
16. Which of the following structures is not found in a prokaryotic cell? *[2015 RS]*
    (a) Ribosome (b) Mesosome
    (c) Plasma membrane (d) Nuclear envelope
17. The structures that help some bacteria to attach to rocks and / or host tissues are: *[2015 RS]*
    (a) Fimbriae (b) Mesosomes
    (c) Holdfast (d) Rhizoids
18. Archaebacteria differ from eubacteria in: *[2014]*
    (a) Cell membrane
    (b) Mode of nutrition
    (c) Cell shape
    (d) Mode of reproduction
19. The motile bacteria are able to move by: *[2014]*
    (a) Fimbriae (b) Flagella
    (c) Cilia (d) Pili
20. Which of the following are likely to be present in deep sea water? *[NEET 2013]*
    (a) Eubacteria (b) Blue-green algae
    (c) Saprophytic fungi (d) Archaebacteria
21. Specialized cells for fixing atmospheric nitrogen in *Nostoc* are *[NEET Kar. 2013]*
    (a) Akinetes (b) Heterocysts
    (c) Hormogonia (d) Nodules
22. The most abundant prokaryotes helpful to humans in making curd from milk and in production of antibiotics are the ones categorised as: *[2012]*
    (a) Cyanobacteria
    (b) Archaebacteria
    (c) Chemosynthetic autotrophs
    (d) Heterotrophic bacteria
23. The cyanobacteria are also referred to as *[2012]*
    (a) protists (b) golden algae
    (c) slime moulds (d) blue green algae
24. How many organisms in the list given below are autotrophs?
    Lactobacillus, Nostoc, Chara, Nitrosomonas, Nitrobacter, Streptomyces, Saccharomyces, Trypanosomes, Porphyra, Wolffia *[2012M]*
    (a) Four (b) Five
    (c) Six (d) Three
25. In eubacteria, a cellular component that resembles eukaryotic cells is: *[2011]*
    (a) plasma membrane (b) nucleus
    (c) ribosomes (d) cell wall
26. Organisms called methanogens are most abundant in a : *[2011]*
    (a) sulphur rock (b) cattle yard
    (c) polluted stream (d) hot spring

27. Bacterial leaf blight of rice is caused by a species of *[2008]*
(a) *Xanthomonas* (b) *Pseudomonas*
(c) *Alternaria* (d) *Erwinia*

28. In the light of recent classification of living organisms into three domains of life (bacteria, archaea and eukarya), which one of the following statements is true about archaea? *[2008]*
(a) Archaea resemble eukarya in all respects
(b) Archaea have some novel features that are absent in other prokaryotes and eukaryotes
(c) Archaea completely differ from both prokaryotes and eukaryotes
(d) Archaea completely differ from prokaryotes.

29. *Thermococcus*, *Methanococcus* and Methanobacterium exemplify: *[2008]*
(a) Archaebacteria that contain protein homologous to eukaryotic core histones
(b) Archaebacteria that lack any histones resembling those found in eukaryotes but whose DNA is negatively supercoiled
(c) Bacteria whose DNA is relaxed or positively supercoiled but which have a cytoskeleton as well as mitochondria
(d) Bacteria that contain a cytoskeleton and ribosomes

30. Which one of the following statements about mycoplasma is wrong ? *[2007]*
(a) They are pleomorphic
(b) They are sensitive to penicillin
(c) They cause diseases in plants
(d) They are also called PPLO.

31. In which of the animals dimorphic nucleus is found? *[2005]*
(a) *Amoeba proteus*
(b) *Trypanosoma gambiense*
(c) *Plasmodium vivax*
(d) *Paramecium caudatum*

32. The most throughly studied fact of the known bacteria-plant interactions is the *[2004]*
(a) cyanobacterial symbiosis with some aquatic ferns
(b) gall formation on certain angiosperms by *Agrobacterium*
(c) nodulation of Sesbania stems by nitrogen fixing bacteria
(d) plant growth stimulation by phosphate-solubilising bacteria

33. The chief advantage of encystment to an *Amoeba* is *[2003]*
(a) the chance to get rid of accumulated waste products
(b) the ability to survive during adverse physical conditions
(c) the ability to live for sometime without ingesting food
(d) protection from parasites and predators

34. Which bacteria is utilized in gober gas plant?
(a) Methanogens *[2002]*
(b) Nitrifying bacteria
(c) Ammonifying bacteria
(d) Denitrifying bacteria

35. Which statement is correct for bacterial transduction ? *[2002]*
(a) Transfer of some genes from one bacteria to another bacteria through virus
(b) Transfer of genes from one bacteria to another bacteria by conjugation
(c) Bacteria obtains its DNA directly
(d) Bacteria obtains its DNA from other external source

36. What is true for cyanobacteria? *[2001]*
(a) Oxygenic with nitrogenase
(b) Oxygenic without nitrogenase
(c) Non-oxygenic with nitrogen
(d) Non-oxygenic without nitrogenase

37. What is true for archaebacteria ? *[2001]*
(a) All halophiles (b) All photosynthetic
(c) All fossils (d) Oldest living beings

38. The main difference in Gram (+)ve and Gram (–)ve bacteria resides in their *[2001]*
(a) cell wall (b) cell membrane
(c) cytoplasm (d) flagella

39. Photosynthetic bacteria have pigments in *[1999]*
(a) leucoplasts (b) chloroplasts
(c) chromoplasts (d) chromatophores

40. In prokaryotes, the genetic material is *[1999]*
(a) linear DNA with histones
(b) circular DNA with histones
(c) linear DNA without histones
(d) circular DNA without histones

41. A few organisms are known to grow and multiply at temperatures of 100–105°C. They belong to *[1998]*
(a) marine archaebacteria
(b) thermophilic sulphur bacteria
(c) hot-spring blue-green algae (cyanobacteria)
(d) thermophilic, subaerial fungi

42. Transfer of genetic information from one bacterium to another in the transduction process is through *[1998]*
(a) Conjugation
(b) Bacteriophages released from the donor bacterial strain
(c) Another bacterium
(d) Physical contact between donor and recipient strain

43. The hereditary material present in the bacterium *Escherichia coli* is *[1998]*
(a) single stranded DNA
(b) deoxyribose sugar
(c) double stranded DNA
(d) single stranded RNA

44. Sex factor in bacteria is *[1996]*
(a) Chromosomal replicon
(b) F-replicon
(c) RNA
(d) Sex-pilus

45. Temperature tolerance of thermal blue-green algae is due to *[1994]*
(a) cell wall structure
(b) cell organisation
(c) mitochondrial structure
(d) homopolar bonds in their proteins

46. Nitrogen fixer soil organisms belong to *[1994]*
(a) mosses (b) bacteria
(c) green algae (d) soil fungi

47. *Entamoeba coli* causes *[1994]*
(a) Pyrrhoea (b) Diarrhoea
(c) Dysentery (d) None

48. *Escherichia coli* is used extensively in biological research as it is *[1993]*
(a) easily cultured
(b) easily available
(c) easy to handle
(d) easily multiplied in host

49. Genophore/bacterial genome or nucleoid is made of *[1993]*
(a) histones and nonhistones
(b) RNA and histones
(c) a single double stranded DNA
(d) a single stranded DNA

50. Bacteria lack alternation of generation because there is *[1992]*
(a) neither syngamy nor reduction division
(b) distinct chromosomes are absent
(c) no conjugation
(d) no exchange of genetic material

51. Name the organisms which do not derive energy directly or indirectly from sun *[1991]*
(a) Chemosynthetic bacteria
(b) Pathogenic bacteria
(c) Symbiotic bacteria
(d) Mould

52. Which one belongs to monera? *[1990]*
(a) *Amoeba* (b) *Escherichia*
(c) *Gelidium* (d) *Spirogyra*

Topic 3: Protista

53. Which of the following organisms are known as chief producers in the oceans? *[2018]*
(a) Dinoflagellates (b) Diatoms
(c) Euglenoids (d) Cyanobacteria

54. Ciliates differ from all other protozoans in *[2018]*
(a) using flagella for locomotion
(b) having a contractile vacuole for removing excess water
(c) having two types of nuclei
(d) using pseudopodia for capturing prey

55. Chrysophytes, Euglenoids, Dinoflagellates and Slime moulds are included in the kingdom *[2016]*
(a) Monera (b) Protista
(c) Fungi (d) Animalia

56. In which group of organisms the cell walls form two thin overlapping shells which fit together? *[2015 RS]*
(a) Euglenoids (b) Dinoflagellates
(c) Slime moulds (d) Chrysophytes

57. In the five-kingdom classification, *Chlamydomonas* and *Chlorella* have been included in *[2012M]*
(a) protista (b) algae
(c) plantae (d) monera

58. Which one of the following organisms is not an example of eukaryotic cells ? *[2011]*
(a) *Paramecium caudatum*
(b) *Escherichia coli*
(c) *Euglena viridis*
(d) *Amoeba proteus*

59. Single-celled eukaryotes are included in: *[2010]*
(a) Protista (b) Fungi
(c) Archaea (d) Monera

60. Which one of the following is a slime mould? *[2007]*
(a) *Physarum* (b) *Thiobacillus*
(c) *Anabaena* (d) *Rhizopus*

61. The thalloid body of a slime mould (Myxomycetes) is known as *[2006]*
(a) plasmodium (b) fruiting body
(c) mycelium (d) protonema

62. Auxopores and hormocysts are formed, respectively, by: *[2005]*
(a) Some diatoms and several cyanobacteria
(b) Some cyanobacteria and diatoms
(c) Several cyanobacteria and several diatoms
(d) Several diatoms and a few cyanobacteria.

63. In *Amoeba* and *Paramecium* osmoregulation occurs through *[2002]*
(a) pseudopodia (b) nucleus
(c) contractile vacuole (d) general surface

64. Which of the following organism possesses characteristics of both a plant and an animal?
(a) Bacteria (b) *Euglena* *[1995]*
(c) *Mycoplasma* (d) *Paramecium*

65. The function of contractile vacuole, in protozoa, is *[1995]*
(a) locomotion (b) food digestion
(c) osmoregulation (d) reproduction

66. Macro and micronucleus are the characteristic feature of *[1995]*
(a) *Paramecium* and *Vorticella*
(b) *Opelina* and *Nictothisus*
(c) *Hydra* and *Ballantidium*
(d) *Vorticella* and *Nictothirus*

67. Excretion in *Amoeba* occurs through *[1995]*
(a) lobopodia (b) uroid portion
(c) plasma membrane (d) contractile vacuole

68. Protistan genome has *[1994]*
(a) membrane bound nucleoproteins embedded in cytoplasm
(b) free nucleic acid aggregates
(c) gene containing nucleoproteins condensed together in loose mass
(d) nucleoprotein in direct contact with cell substance

69. Protists obtain food as *[1994]*
(a) photosynthesisers, symbionts and holotrophs
(b) photosynthesisers
(c) chemosynthesisers
(d) holotrophs

70. Protista includes *[1994]*
(a) heterotrophs (b) chemoheterotrophs
(c) chemoautotrophs (d) all the above

71. African sleeping sickness is due to *[1991]*
(a) *Plasmodium vivax* transmitted by Tse tse fly
(b) *Trypanosoma lewsii* transmitted by Bed Bug
(c) *Trypanosoma gambiense* transmitted by *Glossina palpalis*
(d) *Entamoeba gingivalis* spread by Housefly.

72. Genetic information in *Paramecium* is contained in
(a) micronucleus *[1990]*
(b) macronucleus
(c) both micronucleus and macronucleus
(d) mitochondria

73. Which is true about *Trypanosoma* ? *[1990]*
(a) Polymorphic (b) Monogenetic
(c) Facultative Parasite (d) Non-pathogenic

74. *Plasmodium*, the malarial parasite, belongs to class *[1990]*
(a) Sarcodina (b) Ciliata
(c) Sporozoa (d) Dinophyceae

75. The causal organism for African sleeping sickness is *[1989]*
(a) *Trypanosoma cruzi* (b) *T. rhodesiense*
(c) *T. tangela* (d) *T. gambiense*

76. The vector for sleeping sickness is *[1989]*
(a) House fly (b) Tse-Tse fly
(c) Sand fly (d) Fruit fly

77. Trypanosoma belongs to class *[1989]*
(a) Sarcodina (b) Zooflagellata
(c) Ciliata (d) Sporozoa

78. A bite of Tse-Tse fly may pass to humans
(a) *Leishmania donovani* *[1989]*
(b) *Trypanosoma gambiense*
(c) *Entamoeba histolytica*
(d) *Plasmodium vivax*

79. The infective stage of malarial parasite Plasmodium that enters human body is *[1989]*
(a) merozoite (b) sporozoite
(c) trophozoite (d) minuta form

80. What is common about *Trypanosoma*, *Noctiluca*, *Monocystis* and *Giardia* ? *[2006]*
(a) They have flagella
(b) They produce spores
(c) These are all parasites
(d) These are all unicellular protists

Topic 4: Fungi

81. Which of the following statements is **incorrect**? *[2019]*
(a) Morels and truffles are edible delicacies.
(b) *Claviceps* is a source of many alkaloids and LSD.
(c) Conidia are produced exogenously and ascospores endogenously.
(d) Yeasts have filamentous bodies with long thread-like hyphae.

82. One of the major components of cell wall of most fungi is *[2016]*
(a) Chitin (b) Peptidoglycan
(c) Cellulose (d) Hemicellulose

83. Which one of the following statements is wrong? *[2016]*

(a) Cyanobacteria are also called blue-green algae
(b) Golden algae are also called desmids
(c) Eubacteria are also called false bacteria
(d) Phycomycetes are also called algal fungi

84. Which one one of the following matches is correct ? ***[2015 RS]***

(a)	*Alternaria*	Sexual reproduction absent	Deuteromycetes
(b)	*Mucor*	Reproduction by Conjugation	Ascomycetes
(c)	*Agaricus*	Parasitic fungus	Basidiomycetes
(d)	*Phytophthora*	Aseptate mycelium	Basidiomycetes

85. True nucleus is absent in : ***[2015 RS]***
(a) *Mucor* (b) *Vaucheria*
(c) *Volvox* (d) *Anabaena*

86. The imperfect fungi which are decomposers of litter and help in mineral cycling belong to: ***[2015 RS]***
(a) Basidiomycetes (b) Phycomycetes
(c) Ascomycetes (d) Deuteromycetes

87. Choose the wrong statements: ***[2015 RS]***
(a) *Neurospora* is used in the study of biochemical genetics
(b) Morels and truffles are poisonoues mushrooms
(c) Yeast is unicellular and useful in fermentation
(d) *Penicillium* is multicellular and produces antibiotics

88. Which one of the following fungi contains hallucinogens? ***[2014]***
(a) *Morchella esculenta* (b) *Amanita muscaria*
(c) *Neurospora sp.* (d) *Ustilago sp.*

89. Which one of the following is true for fungi?
(a) They are phagotrophs ***[NEET Kar. 2013]***
(b) They lack a rigid cell wall
(c) They are heterotrophs
(d) They lack nuclear membrane

90. Membrane-bound organelles are absent in: ***[2010]***
(a) *Saccharomyces* (b) *Streptococcus*
(c) *Chlamydomonas* (d) *Plasmodium*

91. Which one is the wrong pairing for the disease and its causal organism? ***[2009]***
(a) Black rust of wheat - *Puccinia graminis*
(b) Loose smut of wheat - *Ustilago nuda*
(c) Root-knot of vegetables - *Meloidogyne sp*
(d) Late blight of potato - *Alternaria solani*

92. Which pair of the following belongs to Basidiomycetes? ***[2007]***
(a) puffballs and *Claviceps*
(b) peziza and stink borns
(c) *Morchella* and mushrooms
(d) birds nest fungi and puffballs.

93. Ergot of rye is caused by a species of ***[2007]***
(a) *Uncimula* (b) *Ustilago*
(c) *Claviceps* (d) *Phytophthora.*

94. Which of the following environmental conditions are essential for optimum growth of *Mucor* on a piece of bread ? ***[2006]***
A. Temperature of about 25°C
B. Temperature of about 5° C
C. Relative humidity of about 5%
D. Relative humidity of about 95%
E. A shady place
F. A brightly illuminated place
Choose the answer from the following options:
(a) A, D and E only (b) B, D and E only
(c) B, C and F only (d) A, C and E only

95. Viruses that infect bacteria, multiply and cause their lysis, are called ***[2004]***
(a) lysozymes (b) lipolytic
(c) lytic (d) lysogenic

96. Mycorrhiza represents ***[2003]***
(a) antagonism (b) endemism
(c) symbiosis (d) parasitism

97. Which of the following secretes toxins during storage conditions of crop plants? ***[2002]***
(a) *Aspergillus* (b) *Penicillium*
(c) *Fusarium* (d) *Colletotrichum*

98. Which fungal disease spreads by seed and flowers?
(a) Loose smut of wheat ***[2002]***
(b) Corn stunt
(c) Covered smut of barley
(d) Soft rot of potato

99. Plant decomposers are ***[2001]***
(a) Monera and fungi
(b) Fungi and plants
(c) Protista and animalia
(d) Animalia and monera

100. Adhesive pad of fungi penetrates the host with the help of ***[2001]***
(a) mechanical pressure and enzymes
(b) hooks and suckers
(c) softening by enzymes
(d) only by mechanical pressure

101. A good green manure in rice fields is ***[2000]***
(a) *Aspergillus* (b) *Azolla*
(c) *Salvinia* (d) *Mucor*

102. In fungi stored food material is ***[2000]***
(a) glycogen (b) starch
(c) sucrose (d) glucose

103. Black rust of wheat is caused by *[2000]*
(a) *Puccinia* (b) *Mucor*
(c) *Aspergillus* (d) *Rhizopus*

104. *Puccinia* forms *[1998]*
(a) uredia and aecia on wheat leaves
(b) uredia and telia on wheat leaves
(c) uredia and aecia on barberry leaves
(d) uredia and pycnia on barberry leaves

105. Mycorrhiza is *[1996]*
(a) a symbiotic association of plant roots and certain fungi
(b) an association of algae with fungi
(c) a fungus parasitising root system of higher plants
(d) an association of *Rhizobium* with the roots of leguminous plants

106. Which of the following is not correctly matched? *[1995]*
(a) Root knot disease - *Meloidogyne javanica*
(b) Smut of bajra - *Tolysporium penicillariae*
(c) Covered smut of barley - *Ustilago nuda*
(d) Late blight of potato - *Phytophthora infestans*

107. The chemical compounds produced by the host plants to protect themselves against fungal infection is *[1995]*
(a) phytotoxin (b) pathogen
(c) phytoalexins (d) hormone

108. White rust disease is caused by *[1995]*
(a) *Claviceps* (b) *Alternaria*
(c) *Phytophthora* (d) *Albugo candida*

109. *Ustilago* causes plant diseases called smut because
(a) they parasitise cereals *[1994]*
(b) mycelium is black
(c) they develop sooty masses of spores
(d) affected parts becomes completely black.

110. *Claviceps purpurea* is causal organism of
(a) Smut of Barley *[1994]*
(b) Rust of Wheat
(c) Ergot of Rye
(d) Powdery Mildew of Pea.

111. Absorptive heterotrophic nutrition is exhibited by *[1990]*
(a) Algae (b) Fungi
(c) Bryophytes (d) Pteridophytes

Topic 5: Viruses Virioids and Prions

112. Which of the following is correct about viroids? *[2020]*
(a) They have free RNA without protein coat
(b) They have DNA with protein coat
(c) They have free DNA without protein coat
(d) They have RNA with protein coat

113. Which of the following statements is **incorrect**? *[2019]*
(a) Viroids lack a protein coat.
(b) Viruses are obligate parasites.
(c) Infective constituent in viruses is the protein coat.
(d) Prions consist of abnormally folded proteins.

114. Mad cow disease in cattle is caused by an organism which has : *[2019]*
(a) Free DNA without protein coat
(b) Inert crystalline structure
(c) Abnormally folded protein
(d) Free RNA without protein coat

115. Viroids differ from viruses in having; *[2017]*
(a) DNA molecules without protein coat
(b) RNA molecules with protein coat
(c) RNA molecules without protein coat
(d) DNA molecules with protein coat

116. Which of the following statements is wrong for viroids? *[2016]*
(a) They lack a protein coat
(b) They are smaller than viruses
(c) They cause infections
(d) Their RNA is of high molecular weight

117. Which of the following shows coiled RNA strand and capsomeres? *[2014]*
(a) Polio virus
(b) Tobacco masaic virus
(c) Measles virus
(d) Retrovirus

118. Viruses have: *[2014]*
(a) DNA enclosed in a protein coat
(b) Prokaryotic nucleus
(c) Single chromosome
(d) Both DNA and RNA

119. Satellite RNAs are present in some *[NEET Kar. 2013]*
(a) Plant viruses (b) Viroids
(c) Prions (d) Bacteriophages

120. Which statement is **wrong** for viruses? *[2012]*
(a) All are parasites
(b) All of them have helical symmetry
(c) They have ability to synthesize nucleic acids and proteins
(d) Antibiotics have no effect on them

121. Virus envelope is known as: *[2010]*
(a) Capsid (b) Virion
(c) Nucleoprotein (d) Core

122. The causative agent of mad-cow disease is a
(a) Prion (b) Worm *[2006]*
(c) Bacterium (d) Virus

123. Viruses are no more "alive" than isolated chromosomes because *[2003]*
(a) both require the environment of a cell to replicate
(b) they require both RNA and DNA
(c) they both need food molecules
(d) they both require oxygen for respiration

124. Which one of the following statements about viruses is correct ? *[2003]*
(a) Nucleic acid of viruses is known as capsid
(b) Viruses possess their own metabolic system
(c) All viruses contain both RNA and DNA
(d) Viruses are obligate parasites

125. Tobacco mosaic virus is a tubular filament of size *[2003]*
(a) 700 × 30 nm (b) 300 × 10 nm
(c) 300 × 5 nm (d) 300 × 20 nm

126. Cauliflower mosaic virus contains *[2001]*
(a) ss RNA (b) ds RNA
(c) ds DNA (d) ss DNA

127. Enzymes are absent in *[2000]*
(a) Cyanobacteria (b) Viruses
(c) Algae (d) Fungi

128. A virus can be considered a living organism because it *[2000]*
(a) responds to touch stimulus
(b) respires
(c) reproduces (inside the host)
(d) can cause disease

129. Which one of the following statements about viruses is correct? *[1997]*
(a) Viruses possess their own metabolic system
(b) Viruses contain either DNA or RNA
(c) Viruses are facultative parasites
(d) Viruses are readily killed by antibiotics

130. Influenza virus has *[1996]*
(a) DNA
(b) RNA
(c) both DNA and RNA
(d) only proteins and no nucleic acids.

131. Tobacco Mosaic Virus (TMV) genes are *[1994]*
(a) double stranded RNA
(b) single stranded RNA
(c) polyribonucleotides
(d) proteinaceous

132. Rickettsiae constitute a group under *[1994]*
(a) bacteria
(b) viruses
(c) independent group between bacteria and viruses
(d) fungi

Topic 6: Lichens

133. Which of the following statements is correct? *[2019, Odisa]*
(a) Lichens are not good pollution indicators.
(b) Lichens do not grow in polluted areas.
(c) Algal component of lichens is called mycobiont.
(d) Fungal component of lichens is called phycobiont.

134. Which of the following are most suitable indicators of SO_2 pollution in the environment?
(a) Conifers (b) Algae *[2015 RS]*
(c) Fungi (d) Lichens

134. Which one single organism or the pair of organisms is **correctly** assigned to its taxonomic group? *[2012]*
(a) *Paramoecium* and *Plasmodium* belong to the same kingdom as that of *Penicillium*
(b) Lichen is a composite organism formed from the symbiotic association of an algae and a protozoan
(c) Yeast used in making bread and beer is a fungus
(d) *Nostoc* and *Anabaena* are examples of protista

136. There exists a close association between the alga and the fungus within a lichen. The fungus *[2005]*
(a) provides protection, anchorage and absorption for the alga
(b) provides food for the alga
(c) fixes the atmospheric nitrogen for the alga
(d) releases oxygen for the alga

137. Lichens are a well known combination of an alga and a fungus where fungus has *[2004]*
(a) a saprophytic relationship with the alga
(b) an epiphytic relationship with the alga
(c) a parasitic relationship with the alga
(d) a symbiotic relationship with the alga

138. Most of the Lichens consist of *[1997]*
(a) blue-green algae and basidomycetes
(b) blue-green algae and ascomycetes
(c) red algae and ascomycetes
(d) brown algae and phycomycetes

139. Which one of the following is not true about lichens? *[1996]*
(a) Their body is composed of both algal and fungal cells
(b) Some form food for reindeers in arctic regions
(c) Some species can be used as pollution indicators
(d) These grow very fast at the rate of about 2 cm per year

140. Organisms which are indicator of SO_2 pollution of air *[1992]*
(a) Mosses (b) Lichens
(c) Mushrooms (d) Puffballs

141. Lichens indicate SO_2 pollution because they *[1989]*
(a) show association between algae and fungi
(b) grow faster than others
(c) are sensitive to SO_2
(d) flourish in SO_2 rich environment

ANSWER KEY																		
1	(c)	16	(d)	31	(d)	46	(b)	61	(a)	76	(b)	91	(d)	106	(c)	121	(a)	136	(a)
2	(a)	17	(a)	32	(b)	47	(d)	62	(d)	77	(b)	92	(d)	107	(c)	122	(a)	137	(d)
3	(d)	18	(a)	33	(b)	48	(a)	63	(c)	78	(b)	93	(c)	108	(d)	123	(a)	138	(b)
4	(b)	19	(b)	34	(a)	49	(c)	64	(b)	79	(b)	94	(a)	109	(d)	124	(d)	139	(d)
5	(c)	20	(d)	35	(a)	50	(a)	65	(c)	80	(d)	95	(c)	110	(c)	125	(d)	140	(b)
6	(d)	21	(b)	36	(a)	51	(a)	66	(a)	81	(d)	96	(c)	111	(b)	126	(c)	141	(c)
7	(c)	22	(d)	37	(d)	52	(b)	67	(d)	82	(a)	97	(a)	112	(a)	127	(b)		
8	(b)	23	(d)	38	(a)	53	(b)	68	(a)	83	(c)	98	(a)	113	(c)	128	(c)		
9	(b)	24	(c)	39	(d)	54	(c)	69	(a)	84	(a)	99	(a)	114	(c)	129	(b)		
10	(a)	25	(a)	40	(d)	55	(b)	70	(d)	85	(d)	100	(a)	115	(c)	130	(b)		
11	(b)	26	(b)	41	(a)	56	(d)	71	(c)	86	(d)	101	(b)	116	(d)	131	(b)		
12	(a)	27	(a)	42	(b)	57	(b)	72	(a)	87	(b)	102	(a)	117	(b)	132	(c)		
13	(d)	28	(b)	43	(c)	58	(b)	73	(a)	88	(b)	103	(a)	118	(a)	133	(b)		
14	(c)	29	(a)	44	(b)	59	(a)	74	(c)	89	(c)	104	(b)	119	(a)	134	(d)		
15	(b)	30	(b)	45	(d)	60	(a)	75	(d)	90	(b)	105	(a)	120	(b)	135	(c)		

Hints & Solutions

1. (c) The kingdom Monera possesses unicellular organisms (e.g - bacteria) having no nuclear membrane.
2. (a) **Five kingdom system of classification** was proposed by **R.H. Whittaker** (1969). The five kingdom classification is based on the following criteria :
   - Complexity of cell structure – Prokaryotes or eukaryotes.
   - Complexity of organisms body – Unicellular or multicellular.
   - Mode of obtaining nutrition – Autotrophic or heterotrophic.
   - Phylogenetic relationships.
3. (d) Monera is the prokaryotic kingdom that includes bacteria, blue green algae (cyanobacteria) and archae-bacteria (a group of ancient bacteria).
4. (b) The five kingdom classification is a mode of classification based on the following criteria.
   - Complexity of cell structure
   - Complexity of body structure
   - Modes of nutrition
   - Ecological life styles
   - Phylogenetic relationship
5. (c) Artificial system of classification is based on comparison of one or a few characters. A system based upon a large no. of natural characters or traits is natural system of classification. Proposed by de Jussieu, phylogenetic system of classification indicates the evolutionary or phylogenetic relationship of organisms.
6. (d) The first phylogenetic system of classification was proposed by Adolf Engler and his associate Karl Prantl in their monograph "Die Naturlichen Pflanzen Familien". In this system of classification, organisms are classified on the basis of evolutionary sequence and genetic relationship among the organisms. Hence, this system is highly dynamic not static.

NOTES Fossil records play a vital role in elucidation of evolutionary relationships. This system has led to new systematics.

7. (c) During the early period in taxonomy, only external morphology (the characters observable with naked eye) were the sole criteria to classify plants and animals. Theophrastus gave names and description of 480 plants in his book "*Historia plantarum*", on the basis of their habit but Pliny the Elder introduced first artificial system of classification in his book *Historia Naturalis*. He classified both plants and animals.
8. (b) Linnaeus put forward an "Artificial system" of plant classification which was based on sexual characters. It is commonly also called as sexual system of plant classification.
9. (b) George Bentham and Joseph Dalton Hooker have given Natural system of classification. In this system of classification all the important characteristic of the organisms that provide information regarding their natural relationship are taken into consideration which helps in bringing out maximum number of similarities in a group and comparable differences with other groups of organisms. For example, mammals are characterised by the presence of mammary gland, hair, vivipary, 4 chambered heart etc.
10. (a) *Azotobacter is aerobic bacteria.* and *Cladophora* is green alga.
    Engelmann used a prism to split light into its spectral components, and then illuminated a green alga, *Cladophora*, placed in a suspension of aerobic bacteria. The bacteria were used to detect the sites of oxygen evolution.
    He observed that aerobic bacteria accumulated mainly in the region of blue and red light of the split spectrum thus giving the first action spectrum of photosynthesis.

NOTES

Theodor Wilhelm Engelmann was a German botanist, whose 1882 experiment measured the effects of different colours of light on photosynthetic activity and showed that the conversion of light energy to chemical energy took place in the chloroplast.

11. (b) *Halophiles* live in salty areas.
    Thermoacidophiles are present in hot springs.
    Methanogens are present in gut of several ruminants.
    Cyanobacteria can be present in freshwater/ marine or terrestrial habitat.
12. (a) Saccharomyces i.e. yeast is an eukaryote (unicellular fungi). Mycobacterium is a bacterium. Oscillatoria and Nostoc are cyanobacteria.
13. (d) Archaebacteria are able to survive in harsh conditions due to the presence of branched lipid chain in cell membrane that reduces fluidity of cell membrane.
    It includes halophiles which are exclusively found in saline habitats.

NOTES

The halophiles, named after the Greek word for "salt-loving", are extremophiles that thrive in high salt concentrations. While most halophiles are classified into the domain Archaea, there are also bacterial halophiles and some eukaryotic species, such as the alga *Dunaliella salina* and fungus *Wallemia* ichthyophaga.

14. (c) Sticky character of the bacterial wall is due to glycocalyx which is rich in glycoproteins.

NOTES

When on eukaryotic cells the glycocalyx can be a factor used for the recognition of the cell. On bacterial cells, the glycocalyx provides a protective coat from host factors.

15. (b) Mycoplasmas are smallest, prokaryotes lacking cell wall and are pleomorphic in nature. These are pathogenic to both plants and animals.
16. (d) Nuclear envelope is not found in a prokaryotic cell.
17. (a) Fimbriae assist some bacteria in attaching to rocks or host body for obtaining establishment and nutrition.

NOTES

A holdfast is a root-like structure that anchors aquatic sessile organisms, such as seaweed, other sessile algae, stalked crinoids, benthic cnidarians, and sponges, to the substrate.

18. (a) Archaebacteria differ from other bacteria in having a different cell wall structure. They lack peptidoglyan in cell wall and possess a monolayer of branched fatty acids attached to glycerol by ether bonds in their cell membranes.
19. (b) Motile bacteria have thin filamentous extensions on their cell wall called flagella.
20. (d) Archaebactera live in some of the most harsh habitats such as extreme salty areas (halophiles), hot springs (thermoacidophiles) and marshy areas (methanogens) and in deep sea water.

21. (b) Heterocysts are large sized, thick-walled specialised cells which occur in terminal, intercalary or lateral position in **filamentous cyanobacteria,** *e.g., Nostoc.* They have enzyme **nitrogenase** and are specialised to perform biological nitrogen fixation.
22. (d) The most abundant prokaryotes helpful to humans in making curd from milk and in production of antibiotics are the heterotrophic bacteria. *Lactobacillis* bacteria convert milk into curd.
23. (d) Cyanobacteria are also referred as blue green algae, they perform oxygenic photosynthesis. They are most successful autotrophic organisms on earth which are found in all types of environment - fresh water, sea water, salt marshes, moist rocks, tree trunks, moist soils, hot springs, frozen waters.
24. (c) Autotrophs are those organisms that are able to make energy-containing organic molecules from inorganic raw material by using basic sunlight. *Nostoc*, *Chara*, *Porphyra* and *Wolffia* are photoautotrophs while *Nitrosomonas* and *Nitrobacter* are chemoautotrophs.
25. (a) Eubacteria are prokaryotic but eubacteria are enclosed by plasma membrane like eukaryotic cells.
26. (b) *Methanogens* are archaebacteria, abundant in cattle yard and paddy fields.

NOTES

Methanogens produce methane as a metabolic byproduct in hypoxic conditions. They are prokaryotic and belong to the domain of archaea.

27. (a) Bacterial leaf blight of rice is caused by a species of *Xanthomonas*. Mature rice plant are infected by these bacteria, lesion begins as water soaked stripes on the leaf blades and eventually would increase in length and width becoming yellow to grayish-white until the entire leaf dries up.
28. (b) A domain of prokaryotic organisms containing the archaebacteria 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 are abundant in the world's oceans.
29. (a) *Thermococcus*, *Methanococcus* and Methanobacterium exemplify archaebacteria that contain protein homologous to eukaryotic core histones.
30. (b) While working at the Rockefeller Institute, Brown reported isolation of a PPLO from human arthritic joint tissue in 1938. In 1949, Diennes reported to the 7th International Rheumatology Congress, the isolation of PPLO from the genitourinary tracts of men afflicted with arthritis. In discussing the significance of this observation, Brown reported successful treatment of arthritic patients in 1949 with a new antibiotic called aureomycin (Clark, 1997).
31. (d) *Paramecium* has two types of nucleus, a larger macronucleus involved with the vegetative activities and a smaller involved with reproduction.
32. (b) This phenomenon has been successfully used in genetic engineering to produce disease resistant varieties of plants.
33. (b) Encystment enables the zygote to survive under adverse or infavourable conditions wherein it lies dormant.
34. (a) *Methanobacillus* (methanogen) occurs in marshes and also in dung. It produces CH_4 gas under anaerobic condition and is utilized in gobar gas plant.

NOTES

Methanogenesis from the biomass in the anoxic biogas reactors is catalyzed by syntrophic cooperation between anaerobic bacteria, syntrophic acetogenic bacteria and methanogenic archaea.

35. (a) Transduction is virus mediated gene transfer in bacteria.

NOTES

Viral transfer of DNA from one bacterium to another is an example of **horizontal gene transfer**.

36. (a) Cyanobacteria are oxygenic photoautotroph. Many members perform nitrogen fixation.
37. (d) Archaebacteria are the most ancient and halogenous group of bacteria and are called living fossils.
38. (a) Gram +(ve) and Gram –(ve) bacteria are separated on the basis of their cell wall composition. Christian Gram, on the basis of staining behaviour of the cell wall with Gram's stain, grouped bacteria into Gram +ve and Gram –ve type. The bacteria which retain blue or purple colour after staining are Gram +ve e.g. *Bacillus subtilis* and which loses blue colour is Gram –ve e.g. *E. coli*. In Gram –ve, stain is washed due to high lipid content in the cell having thick wall, Gram +ve has single layered cell wall rich in peptidoghycans which retain the colour.
39. (d) Chloroplasts, chromoplasts and leucoplasts are the types of plastids found in higher plants. Chloroplasts contain the green pigment chlorophyll.

NOTES

Chromatophores are internal membrane systems present in photosynthetic prokaryotes. These develop as membrane lined sacs or thylakoids from plasma membrane. Thylakoid membranes contain photosynthetic pigments in cyanobacteria and purple bacteria.

40. (d) In prokayotes nucleoid consist of double stranded circular DNA without histone protein.
41. (a) These are archaebacteria which can tolerate high temperature.
42. (b) Transfer of genetic information from one bacterium to another by physical contact is called conjugation while if it takes place by some other medium like virus than it is called transduction.
43. (c) In (*E.coli*) double stranded DNA is present.

NOTES

E. coli is a Gram-negative, facultative anaerobic, rod-shaped, coliform bacterium of the genus *Escherichia* that is commonly found in the lower intestine of warm-blooded organisms. Most types of *E. coli* are harmless and even help keep your digestive tract healthy. But some strains can cause diarrhea if you eat contaminated food or drink fouled water.

44. (b) Sex-factor or F-factor in bacteria results in high frequency conjugation. It allows bacteria to produce sex pilus necessary for conjugation.
45. (d) Some of the blue green algae can tolerate extremes of temperature due to presence of gelatinous sheath, and compactness of protein molecules in protoplasm.
46. (b) Only some bacteria and blue green algae (cynobacteria) have the capacity to fix atmospheric nitrogen.
    - Bacteria : *Azotobacter, Rhizobium, Frankia* etc.
    - Blue green algae : *Nostoc, Oscillatoria, Anabaena* etc.
47. (d) Pyrrhoea is caused by bacterial infections along with other factors, Diarrhoea by caused by rotavirus along with many other factors. Dysentery is caused by *Entamoeba histolytica*.

NOTES

Entamoeba coli is a non-pathogenic species of *Entamoeba* that frequently exists as a commensal parasite in the human gastrointestinal tract. *E. coli* is important in medicine because it can be confused during microscopic examination of stained stool specimens with the pathogenic *Entamoeba histolytica*.

48. (a) *Escherichia coli*, lives as a symbiont in human intestine.
49. (c) The bacterial genome/nucleoid is made of single circular double stranded DNA without histone protein as it is a prokaryotic organisms. The genome contains some 100 chemical sites or loci. Each locus in *E. coli* contains about 40 genes.
50. (a) In bacteria asexual reproduction through binary fission is the most common method of multiplication. Sexual reproduction which comprises of syngamy and meiosis is entirely absent. Hence, no gamete formation takes place. In sexually reproducing organism alternation of generation occurs.
51. (a) Chemosynthetic bacteria do not require sunlight as a source of energy either directly or indirectly. The energy for the synthesis of food is obtained by the oxidation of certain inorganic substances present in the medium. The chemical energy obtained from oxidation reaction is trapped in ATP molecules. The ATP is used in CO_2 assimilation.
52. (b) Whittaker (1969) divided organisms into five kingdoms : Monera, Protista, Plantae, Fungi and Animalia. Kingdom Monera includes all prokaryotes – Mycoplasma, bacteria, actinomycetes, blue-green algae, archaebacteria, methanogens. *Escherichia* is bacteria, *Amoeba*, *Gelidium* come under Protista, *Spirogyra* is algae.
53. (b) Diatoms are the chief producers in some oceans and in some seasons as they are the primary producers and the food chain in marine ecosystem depends on it.
54. (c) Ciliates differs from other protozoans in having two types of nuclei. E.g., Paramoecium have two types of nuclei i.e. macronucleus & micronucleus.
55. (b) All unicellular eukaryotic organism like diatoms, desmids (chrysophytes), euglenoids, dinoflagellates and slime mould are included in Protista.
56. (d) In chrysophytes, the cell walls form two thin overlapping shells held together. The body of Diatoms appears like soap box due to overlapping shells.
57. (b) *Chlamydomonas* & *Chlorella* have been included in algae. Algae are chlorophylus, thalloid avascular plants with no cellular differentiation. Algae belong to thallophyta of plant kingdom.
58. (b) *E. coli* is a prokaryotic gram negative bacterium.

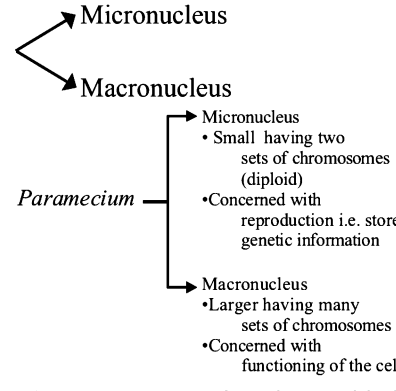
59. (a) Single celled eukaryotes are included in protista. Protista includes all unicellular and colonial eukaryotes except green and red algae. It is also known as kingdom of unicellular eukaryotes.
60. (a) *Physarum polycephalum* belongs to phylum Amoebozoa, infraphylum Mycetozoa, and class Myxogastrea. *P. polycephalum*, often referred to as the "many-headed slime," is a slime mold that inhabits shady, cool, moist areas, such as decaying leaves and logs.
61. (a) The thalloid body of slime moulds is made up of multinucleated cell which lacks septa in between and hence it is a multinucleated single celled mass called plasmodium.
62. (d) Binary fission in diatoms reduces the size of most daughters which is corrected through the development of auxospores.
In some filamentous cyanobacterial forms unisexual reproduction occurs by hormogonia (hormocysts). They are identified by presence of biconcave (one disk or separation disc between two adjacent cells e.g. *Oscillatoria*).
63. (c) Contractile vacuole in *Amoeba* and *Paramecium* maintain the water balance of the cell. This is known as osmoregulation.

NOTES It was previously known as pulsatile or pulsating vacuole.

64. (b) The *Euglena* is an organism, which possesses both the characteristics of plants and animals, as it can move with a flagella and also contains chlorophyll. Its nutrition is mixotrophic.

NOTES Euglena is a genus of single cell flagellate eukaryotes. It is the best known and most widely studied member of the class Euglenoidea. Species of Euglena are found in both freshwater and salt water.

65. (c) In protozoa, the function of contractile vacuole is the removal of excretory substances, carbon dioxide etc. It is very essential to regulate water content i.e., osmoregulation.
66. (a) The macronucleus lacks nuclear membrane and is formed of trophochromatin. It regulates the metabolic activities of the body and it is also known as trophonucleus. The micronucleus has a definite nuclear membrane and controls the reproductive activities of *Paramecium* and *Vorticella*.
67. (d) The conractile vacuole is supposed to assist excertion in *Amoeba*, as its watery contents possess traces of carbon dioxide and urea. The CO_2 diffuses directly through plasmalemma.
68. (a) Protistans are eukaryotes and their genetic material is organised in form of nucleus. DNA is associated with histone protein.
69. (a) Members of kingdom Protista have diverse mode of nutrition. They are photosynthetic, saprophytic, parasitic and ingestive. They are major heterotrophs.
70. (d) Kingdom Protista includes flagellates (euglenophyceae), diatoms, dinoflagellates, slime moulds, sarcodines, ciliates, sporozoans. They have photosynthetic, chemotrophic, heterotropic mode of nutrition.
71. (c) I. African sleeping sickness disease also called as trypansomiasis is common in western and central parts of African continent.
II. The disease is caused by parasite *Trypanosoma gambiense* of class zooflagellata.
III. The parasite is transmitted through bite of Tse-Tse fly (vector *Glossina palpalis*).
IV. The disease appears when the causal organism enters into cerebrospinal fluid of human.
V. Trypanosoma is an obligate parasite, digenetic and polymorphic organism.
72. (a) *Paramecium* has two nuclei



73. (a) *Trypanosoma* is polymorphic i.e. it exists in different forms in the successive stages of its life cycle. These are *Leishmania*, Leptomonad, Crituidial and trypanosomal stages.
74. (c) *Plasmodium* belongs to class Sporozoa of protozoan protists. It is an endoparasite lacking any locomotory structure and contractile vacules. It reproduces through spore formation.
75. (d) African sleeping sickness disease also called trypanosomiasis, that is common in Africa which is caused by parasite, *Trypanosoma gambiense*. The parasite is transmitted by Tse-Tse fly (*Glossina palpalis*).
76. (b) Vector for sleeping sickness is Tse-Tse fly (*Glossina palpalis*). The parasite *Trypanosoma*

is transmitted through the bite of this fly. Tse-tse have been extensively studied because they are biological vectors of the African trypanosomiasis, deadly disease which includes sleeping sickness in people and nagana in cattle. Tse-tse have existed in the modern morphological form for at least 34 million years since fossil tse-tse have been recovered from the Florissant Fossil Beds in Colorado.

77. (b) Zooflagellata of Protozoan Protista. They have flagella and heterotrophic (Parasitic) mode of nutrition.
78. (b) Tse-Tse fly is vector of sleeping sickness disease and it transmits *Trypanosoma gambiense* through its bite.
79. (b) The infective stage of *Plasmodium* that enters human blood is sporozoite.
80. (d) *Trypanosoma*, *Noctiluca*, *Monocystis* & *Giardia* are unicellular protists *i.e.* unicellular eukaryotes.
81. (d) Yeast is an unicellular sac fungi. It lacks filamentous structure or hyphae.
82. (a) A cell wall is a rigid structural layer, which provides protection and structural support to the cells. The composition of cell wall varies from one species to another. In fungi, the cell wall is composed of strong covalent linkages of chitin, glucans and glycoproteins. Alternatively, in case of land plants, the cell wall is composed of cellulose and hemicellulose. Archean cell walls consists of peptidoglycans.
83. (c) Eubacteria are the true bacteria.

NOTES

Eubacteria are prokaryotic organisms, as characterized by the lack of a membrane-enclosed nucleus, predominantly unicellular, with DNA in single circular chromosome, and have peptidoglycan on cell wall when present. They include most of the familiar bacteria of medical and economic importance such as *E. coli*.

84. (a) *Alternaria* belongs to class - Deuteromycetes, which lack sexual reproduction. Asexual reproduction takes place by conidia produced on conidiophores.
85. (d) *Anabaena* is a cyanobacteria which lack a true nucleus because of absence of nuclear membrane.

NOTES

Anabaena is a genus of filamentous cyanobacteria that exist as plankton. They are known for nitrogen-fixing abilities, and they form symbiotic relationships with certain plants, such as the mosquito fern.

86. (d) Class- deuteromycetes comprises of imperfect fungi which play role in decomposition of organic wastes.

NOTES

The fungi imperfecti or imperfect fungi, also known as Deuteromycota, are fungi which do not fit into the commonly established taxonomic classifications of fungi that are based on biological species concepts or morphological characteristics of sexual structures because their sexual form of reproduction has never been reported.

87. (b) Morel and truffles are used as food and they are members of Ascomycetes fungi.
88. (b) Several mushrooms such as *Amanita muscaria*, *Psilocybe mexicana* and *Panaeolus* spp. secrete hallucinogenic substances like psilocybin and psilocin. These substances may destroy brain cells and power of perception in human beings.
89. (c) Fungi lack chlorophyll, hence, they do not prepare their food by photosynthesis. They can grow where organic material is available. So, they are heterotrophs that acquire their nutrient by absorption and store in the form of glycogen.
90. (b) Membrane bound organelles are absent in *Streptococcus*. It is a bacterium that is included under kingdom Monera. Monerans are prokaryotes which lack membrane bound organelles like mitochondria, E.R, Golgi etc. *Saccharomyces*, *Chlamydomonas* and *Plasmodium* are eukaryotes that have membrane bound organelles.
91. (d) Late blight is caused by the fungus *Phytophthora infestans*. Late blight appears on potato or tomato leaves as pale green, water-soaked spots, often beginning at leaftips or edges. The circular or irregular leaf lesions are often surrounded by a pale yellowish-green border that merges with healthy tissue. Lesions enlarge rapidly and turn dark brown to purplish-black.

NOTES

During periods of high humidity and leaf wetness, a cottony, white mold growth is usually visible on lower leaf surfaces at the edges of lesions. In dry weather, infected leaf tissues quickly dry up and the white mold growth disappears. Infected areas on stems appear brown to black and entire veins may be killed in a short time when moist weather persists.

92. (d) The class Basidiomycetes includes those members that produce their basidia and basidiospores on or in a basidiocarp.

93. (c) Ergot of Rye is a plant disease that is caused by the fungus *Claviceps purpurea*. The so-called ergot that replaces the grain of the rye is a dark, purplish sclerotium, from which the sexual stage, of the life cycle will form after over wintering.

Ergot of Rye

94. (a) Mucor is a fungus and most of the fungi require the optimum temperature of about 15-30°C, good moisture content in atmosphere and not very dark and not very lightened place. So *Mucor* requires a temperature of about 25°C, humidity about 95% and a shady place to grow fully.
95. (c) Viruses that get integrated with the bacterial host genome are called lysogenic. Virus which transmit its DNA into bacterial cell and divide within bacterial cell causing breakdown of bacterial cell wall are called lytic virus. Lysozymes are lipolytic enzymes that catalyse breakdown of fats (lipids).
96. (c) Mycorrhiza is a symbiotic association between fungi and roots of higher plants. Mycorrhiza form wooly covering of fungal hyphae on the surface and remain in upper layers. It is of two types ecto and endomycorrhiza.

NOTES

In some endomycorrhiza, the fungal hyphae develop some organs called vesicles within the root cortical cells, such mycorrhizae are called VAM (vesicular arbuscular mycorrhizae). It is meant for phosphate nutrition.

97. (a) *Aspergillus flavus* produces carcinogenic fungus toxin (Aflatoxin) during storage condition of crop plant.

NOTES

Aflatoxins are poisonous carcinogens and mutagens that are produced by certain molds (*Aspergillus flavus* and *Aspergillus parasiticus*) which grow in soil, decaying vegetation, hay, and grains.

98. (a) *Ustilago* causes loose smut of wheat, as a result the grain and flower get converted into powdered mass.
99. (a) Plant decomposers are bacteria (Kingdom Monera) and fungi.
100. (a) The fungal hyphae secrete enzymes which convert insoluble complex food material in the substratum to the soluble ones. The hyphae wall of intracellular hyphae come in contact with the host protoplasm and obtain food by direct diffusion.
101. (b) *Aspergillus* is a fungus, *Mucor* is also a fungus. Azolla harbors blue-green algae *Anabaena* which fixes N_2, increasing fertility.

NOTES

Azolla is unique because it is one of the fastest growing plants on the planet – yet it does not need any soil to grow. Unlike almost all other plants, Azolla is able to get its nitrogen fertilizer directly from the atmosphere. Azolla is able to do this because it has a unique mutually beneficial 'symbiotic relationship' with a cyanobacterium (blue-green alga) called Anabaena.

102. (a) Glycogen is a glucosan homopolysaccharide which is the major reserve food of animals, fungi and some bacteria. Starch is also glucosan homopolysaccharide and is the major reserve food of plants. Sucrose is formed of one molecule of glucose and one molecule of fructose.
103. (a) Black rust of wheat is caused by *Puccinia graminis*. The symptoms are seen in stem or leaf sheath as brownish spot.
104. (b) *Puccinia* causes black rust of wheat . It completes its life cycle in two hosts-wheat and barberry. Two types of spores are produced on wheat - uredospores and teleutospores.
105. (a) Association of algae and fungi is referred to as lichen. Symbiotic association of *Rhizobium* with roots of leguminous plants is referred to as symbiosis. Mycorrhiza is a symbiotic association between fungi and roots of higher plants. The fungal partner of mycorrhiza obtains food from roots of the higher plant and in return supplies mineral elements to it.
106. (c) Covered smut of barley is caused by *Ustilago hordei,* not by *Ustilago nuda*. This disease is purely externally seed borne.
107. (c) Phytoalexins are non-specific antibiotic substances produced by plants in response to infection by a fungus.

NOTES

Phytoalexins are antimicrobial and often antioxidative substances synthesized de novo by plants that accumulate rapidly at areas of pathogen infection. They are broad spectrum inhibitors and are chemically diverse in a particular plant species.

108. (d) *Albugo candida* is an obligate parasite causing white rust on members of family Cruciferae and other hosts.
109. (d) Smut disease is caused by *Ustilago* species of basidiomycetes fungi. It is characterised by formation of black coloured chlamydospores or teleutospores called smut spore due to which the affected part becomes black.

110. (c) The fungus that causes the disease 'Ergot of Rye' is *Claviceps purpurea*. It contains many poisonous alkaloids. The hallucinogenic drug LSD is extracted from this fungi.
    - Rust of wheat is used by *Puccinia graminis*.
    - Powdery mildew of pea is caused by *Erysiphae*.
111. (b) Fungi are nutritionally saprophytes, which grow on dead and decaying matter. They secrete enzyme to the external medium where digestion takes place and digested food is absorbed by the body surface. They convert complex organic constituents of dead body into simple soluble forms. That is why fungi are regarded as decomposers.
112. (a) Viroids have free RNA without protein coat. Viroid, an infectious particle smaller than any of the known viruses, an agent of certain plant diseases. The particle consists only of an extremely small circular RNA (ribonucleic acid) molecule, lacking the protein coat of a virus.

NOTES Dr. Theodor o. Diener, discovered viroids and also to distinguish it from a virus.

113. (c) Infective constituent in viruses is either DNA or RNA, not protein. The simplest form consist of two basic components: nucleic acid (single- or double-stranded RNA or DNA) and a protein coat, the capsid, which functions as a shell to protect the viral genome from nucleases and which during infection attaches the virion to specific receptors exposed on the prospective host cell.
114. (c) Prions are disease causing agents having abnormally folded proteins. Prions induce other healthy proteins to fold incorrectly, leaving patches of useless debris and holes that turn brains to sponge, resulting in death. The disease has an incubation period in cattle of up to eight years.

NOTES Mad cow disease (or bovine spongiform encephal-opathy) is a transmissible, slowly progressive, degenerative, and fatal disease affecting the central nervous system of adult cattle. It's related to a disease in humans called variant Creutzfeldt-Jakob disease (vCJD). Both disorders are universally fatal brain diseases caused by a prion.

115. (c) Viroids in nature are sub-viral agents as infectious RNA particles, without protein coat.
116. (d) Viroids, the smallest known pathogens, are naked, circular, single-stranded RNA molecules that do not encode protein but autonomously replicate when introduced into host plants. Viroids only infect plants; some cause economically important diseases of crop plants, while others appear to be benign.
117. (b) **TMV (Tobacco Mosaic Virus)** is a rod-shaped virus. The rod has a core which contains helically coiled single stranded **RNA.** There is a protective covering of protein called **capsid** around the infective part. Capsid consists of small subunits called **capsomeres** and has antigenic property.
118. (a) All viruses are nucleoproteins (Nucleic acid + Protein) in the structure. The nucleic acid (DNA and RNA) is the genetic material. In a particular virus either DNA or RNA is the genetic material. Both are never present in a virus. Single stranded RNA or ss RNA - Tobacco mosaic virus (TMV)
    Virus envelope is known as capsid. The capsid is composed of protein subunits called capsomere.
119. (a) Plant viruses often contain parasites of their own, referred to as satellites. Satellite RNAs are dependent on their associated (helper) virus for both replication and encapsidation. Example—Tobacco Necrosis Virus (TNV). Viroids are infectious agents smaller than viruses. Bacteriophages are viruses that infect the bacteria. A prion is an infectious agent that is composed primarily of protein.
120. (b) All the viruses are obligate parasite *i.e.* they remain inert outside the host cell. They have ability to syntheize nucleic acids and proteins by using host cellular machinery (ribosomes, tRNAs, aminoacids, energy). Three shapes are found in viruses helical (elongate body *e.g.* T.M.V), cuboidal (short broad body with rhombic rounded, polyhedral shape *e.g.* Poliomyelitis virus) and binal (with both cuboidal and helical parts *e.g.* many bacteriophages like T_2). Antibiotics have no effect on them, antiviral drugs can only kill them.
121. (a) Virus envelope is known as capsid. The capsid is composed of protein subunits called capsomere.
122. (a) Mad cow disease is actually Bovine Spongiform Encephalopathy or BSE. In this disease cattles in Britain got spongy brain & ultimately gradual degradation of nervous system. It is caused by some virus like but nucleic acid devoid proteinaceous particles called prions (proteinaceous infectious particle).
123. (a) Viruses can live only inside the host cell, using their machinery for its own metabolism.
124. (d) Virus is a nucleoprotein entity which becomes active only inside a living cells utilizing the latter machinery for multiplication. Capsid is the protein covering the genetic material.
125. (d) Tobacco mosaic virus is 300 nm long and 20 nm in diameter.
126. (c) Cauliflower mosaic virus contains double stranded DNA.
127. (b) Enzymes are absent in viruses because they are unable to transmit their nucleic acid from one host cell to another.

128. (c) Virus is an ultra microscopic nucleoprotein entity which becomes active only inside a living cell. It resembles living beings due to presence of genetic material and reproduction.
129. (b) Viruses have either DNA or RNA as the genetic material. Viruses having RNA as the genetic material are known as retroviruses.
130. (b) Influenza virus is a retrovirus wherein, the genetic material comprises of RNA.
There are three genera of influenza virus, identified by antigenic differences in their nucleoprotein and matrix protein:
- Influenza virus A are the cause of all flu pandemics and are known to infect humans, other mammals and birds (see also avian influenza).
- Influenza virus B are known to infect humans and seals.
- Influenza virus C are known to infect humans and pigs.

131. (b) All viruses are nucleoprotein (Nucleic acid + Protein) in their structure. The nucleic acid (DNA and RNA) is genetic material. In a particular virus either DNA or RNA is genetic material. Both are never present in a virus. Hence viruses contains:
(i) Double stranded DNA (ds DNA) - Hepatitis B
(ii) Single stranded DNA (ss DNA) - coliphage
(iii) Double stranded RNA (ds RNA) - Reo virus, wound Tumor virus
(iv) Single stranded RNA (ss RNA) - Tobacco mosaic virus (TMV)
132. (c) Rickettsia are tiny obligate, intracellular parasites found in blood sucking insects like lices, mites, ticks.

NOTES

They were first observed by Ricketts in 1909 but it was properly described by Rocha-lime 1916, who named them as Rickettsia. They have mucopeptide cell wall with DNA as genetic material and are independent entity causing diseases like Q-fever, typhus etc.

133. (b) Lichen is a symbiosis between different organisms. It is composed of a fungal partner (mycobiont) and one or more photosynthetic partners (photobiont). The photosynthetic partner is generally green algae or cyanobacteria.
Lichens are well known as sensitive indicators of air pollution, particularly for sulphur dioxide. If air is very badly polluted with sulphur dioxide there may be no lichens present, just green algae may be found. If the air is clean, shrubby, hairy and leafy lichens become abundant.
134. (d) Lichens cannot grow in places where sulphur dioxide is present in the environment.
135. (c) *Saccharomyces cervisiae* is a yeast used in making bread (Baker's yeast) and commercial production of ethanol.
Paramoecium & *Plasmodium* are of animal kingdom while *Pencillium* is a fungi. Lichen is composite organism formed from the symbiotic association of an algae and a fungus. *Nostoc* & *Anabaena* are examples of kingdom monera.
136. (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 performs photosynthesis and provides food to the fungus.
137. (d) Lichens are composite organisms formed by symbiotic association between a fungus and alga. A saprophyte is an organism feeding on dead, decaying organic matter. Epiphyte is a plant growing over another plant. Parasites live inside their host.
138. (b) The lichen fungus is typically a member of the Ascomycota, rarely a member of the Basidiomycota. The algal or cyanobacterial cells are photosynthetic, and as in higher plants they reduce atmospheric carbon dioxide into organic carbon sugars to feed both symbionts. Both partners gain water and mineral nutrients mainly from the atmosphere through rain and dust. The fungal partner protects the alga by retaining water, serving as a larger surface area for capture of mineral nutrients and, in some cases, provides minerals obtained from the substratum.

NOTES

If a cyanobacterium is present, as a primary partner or another symbiont in addition to green alga as in certain tripartite lichens, they can fix atmospheric nitrogen, complementing the activities of the green alga.

139. (d) Lichens are composite organisms formed by the association between a fungus and a photosynthetic symbiont. The bulk of lichen body is formed of fungus.
140. (b) Lichens are composite organisms representing a symbiotic association between fungus and a algae. It can be crustose, foliose and fruticose types. They are the pioneer organisms in a new habitat. Lichens are used as indicator of air pollution. It does grow in the environment where pollution level is high, SO_2 is strong air pollutant and lichens are very sensitive to SO_2.
141. (c) Lichens typically grow in harsh environments in nature. Most lichens, especially epiphytic fruticose species and those containing cyanobacteria, are sensitive to manufactured pollutants. Hence, they have been widely used as pollution indicator organisms.