BIOLOGICAL CLASSIFICATION

1. Osmoregulation in *Paramecium* is a function of
   a) Contractile vacuole b) Trichocysts c) Cytopyge d) Cytostome
2. Fungi imperfecti includes
   a) *Aspergillus* and *Penicillium* b) *Alternaria* and *Trichoderma*
   c) *Ustilago* and *Puccinia* d) *Alternaria* and *penicillium*
3. Which of the following is a non-hyphal unicellular fungus?
   a) Yeast b) *Puccinia* c) *Ustilago* d) *Alternaria*
4. Auxospores and homocysts are formed, respectively by
   a) Several diatoms and a few cyanobacteria b) Several cyanobacteria and several diatoms
   c) Some diatoms several cyanobacteria d) Some cyanobacteria and many diatoms
5. HIV is classified as a retrovirus because its genetic information is carried in
   a) DNA instead of RNA b) DNA c) RNA instead of DNA d) Protein coat
6. Consider the following statements
   I. Mycelium is branched and septate
   II. The asexual spores are generally not formed
   III. Vegetative reproduction takes place by framentation
   IV. Sex organs are absent but sexual reproduction takes place by somatogamy
   V. Karyogamy and meiosis takes place in basidium to form haploid four basidiospores
   Vi. Basidia are arranged in fruiting bodies called basidiocarp
   The above statements are assigned to
   a) Sac fungi b) Bracket fungi c) Imperfecti fungi d) Club fungi
7. Aristotle classified the plants on the basis of their morphological characters and categorised them into
   a) Tree, shrubs and herbs
   b) Algae, bryophytes, pteridophytes, gymnosperms and angiosperms
   c) Embryophytes and tracheophytes
   d) Algae and embryophytes
8. Citrus canker is a
   a) Viral disease b) Bacterial disease c) Fungal disease d) Protozoan disease
9. Which is correct?
   a) RNA is genetic material of bacteria b) RNA is genetic material of all virus
   c) DNA is genetic material of some organism d) Some virus has RNA as genetic material
10. African sleeping sickness is caused by
    a) *Trypanosoma* b) *Leishmania* c) *Latimeria* d) *Plasodium*
11. Read the following statement about bacteria and select the correct option
    a) Bacteria are simple in structure but complex in behavior b) Bacteria are complex in structure but simple in behavior
    c) Bacteria are simple in both structure and behavior d) Bacteria are complex in both structure and behavior
12. Which of the following is a Gram negative bacterium?
    a) *Escherichia coli* b) *Bacillus subtillis*
    c) *Streptomyces coelicolor* d) *Ampycolatopsis orientalis*
13. Virus consists of

a) Nucleic acid b) Protein c) Both (A) and (B) d) None of these

14. Parasitic and saprophytic conditions are more familiar in
a) Fungi b) Bacteria c) Algae d) Ferns

15. Bacteriophage releases lysozyme during
a) Penetration phase b) Eclipse phase c) Absorption phase d) Maturation phase

16. *Cladonia rangiferina* is a/an
a) Algae b) Lichen c) Fungus d) Angiosperm

17. According to five kingdom classification bacteria belong to
a) Protista b) Monera c) Plantae d) Archaea

18. Which of the following is a free living nitrogen fixing bacterium present in the soil?
a) *Nitrosomonas* b) *Rhizobium* c) *Azotobacter* d) *Pseudomonas*

19. The genetic material of rabies virus is
a) Double stranded RNA b) Single stranded RNA c) Double stranded DNA d) Single stranded DNA

20. All of the following fungi belongs to Phycomycetes, except
a) *Rhizopus* b) *Mucor* c) *Albugo* d) *Agaricus*

21. Which is correct for bacteria?
a) They have both cyclic and non-cyclic photophosphorylation
b) They absorb light > 900 nm of wavelength
c) They release O_2 during photosynthesis
d) They use H_2O during photosynthesis

22. Consider the following statements
I. In this group, the *Plasmodium* differentiates and forms fruiting bodies, bearing spores at their tips
II. Spores possess true walls
III. The spores are dispersed by air currents
IV. The spores are extremely resistant and survive for many years even under adverse conditions
The above statements are assigned to
a) Euglenoid b) Slime moulds c) Dinoflagellates d) Chrysophytes

23. Purified antibiotic penicillin of *Penicillium notatum* was discovered by
a) Alexander Fleming b) Howard Floxy c) Robert Hooke d) Carolus Linnaeus

24. *Thermococcus*, *Methanococcus* and *Methanobacterium* are
a) Archaebacteria having eukaryotic histone homologue
b) Bacteria with cytoskeleton
c) Archaebacteria with negatively supercoiled DNA as eukaryotes but lacking histones
d) Bacteria having positively coiled DNA, cytoskeleton, mitochondria

25. Identify the correct pair of events when temperate phages infect bacteria.
I. No prophages are formed
II. Bacterial cell undergoes many divisions.
III. Bacterial cell undergoes immediate lysis.
IV. Prophages are formed
The correct pair is
a) I and II b) II and III c) III and IV d) II and IV

26. Which of the following is an edible fungi?
a) *Mucor* b) *Penicillium* c) *Agaricus* d) *Rhizopus*

27. Animal cells do not have
a) Plasma membrane b) Cell wall c) Chloroplast only d) Both (a) and (c)

28. Which group of organisms is represented by the given figure?

a) Dinoflagellates b) Protozoans c) Slime mould d) Euglenoids

29. State whether the given statements are true or false
I. Five kingdom system of classification did not differentiated between the heterotrophic group, fungi and the autotrophic green plants, through they showed a characteristic difference in their walls composition.
II. Fungi wall contains chitin, while the green plants has a cellulosic cell wall
Codes
a) I is true, but II is false
b) I is false, but II is true
c) I and II are true
d) I and II are false

30. Under favourable conditions slime moulds form
a) *Protonema* b) *Plasmodium* c) Mycelium d) Fruiting bodies

31. Which of the following class of fungi helps in mineral cycling?
a) Deuteromycetes
b) Basidiomycetes
c) Ascomycetes
d) Phycomycetes

32. Teichoic acid is present in
a) Cell wall of Gram positive bacteria
b) Cell wall of Gram negative bacteria
c) Capsid of virus
d) Protoplasm of mycoplasma

33. Red tide in warms coastal water is caused due to the rapid multiplications of
a) Euglena b) Diatoms c) *Gonyaulax* d) *Paramecium*

34. Which of the following groups are placed under the kingdom-Protista?
a) Crysophytes
b) Dianoflagellate and euglenoids
c) Slime moulds and protozoans
d) All of the above

35. Which of the following statements is correct with respect to *Colletotrichum falcatum*?
a) The conidia and conidiophores are aseptate mycelium and setae are septate
b) The conidia, conidiophores, mycelium and setae are septate
c) The conidia are aseptate conidiophores, mycelium and setae septate
d) The mycelium is septate conidia, conidiophores and setae are aseptate

36. Ainsworth put *Rhizopus* in
a) Zygomycotina b) Mastigomycotina c) Myxomycotina d) Ascomycotina

37. The disease caused by virus which is 42 nm in size and contains double stranded DNA is
a) Hepatitis-A b) AIDS c) Hepatitis-B d) Leprosy

38. The disease caused by *Trypanosoma* is
a) Yellow fever b) Sleeping sickness c) Kala azar d) Hey fever

39. In which animal, dimorphic nucleus us found?
a) *Amoeba*
b) *Trypanosoma gambiense*
c) *Plasmodium vivax*
d) *Paramecium caudatum*

40. Kingdom-Monera consists of
a) Unicellular eukaryotes
b) Multicellular eukaryotes
c) Bacteria
d) Both (a) and (c)

41. Slimy mass of protoplasm with many nuclei and an *Amoeba* –like thalloid body is a characteristic feature of
a) Ascomycetes b) Actinomycetes c) Phycomycetes d) Myxomycetes

42. The bacteria that can reside in extreme salty areas are called as
a) Halophiles b) Methanogens c) Basophiles d) Thermoacidophiles

43. In which of the following patterns of viral replication, viruses enter a cell, replicate and then cause the cell to burst, releasing new viruses?
a) Lytic b) Lysogenic c) Repreogenic d) Both (a) and (b)

44. Potato leaf roll or leaf curl of papaya are caused by
a) Fungi b) Viruses c) Bacteria d) Nematodes

45. The given statements describes a group of organism
I. Instead of a cell wall, they have a protein rich layer called pellicle which makes their body flexible
II. They have two flagella a short and a long one

III. They are photosynthetic in the presence of sunlight, when deprived of sunlight they behave like heterotrophs by predating on other smaller organism

Which of the following group is referred here?

a) Slime moulds b) Dinoflagellates c) Euglenoids d) Protozoans

46. In the light of recent classification of living organisms into three domains of life (bacteria, archaea and eukarya), which one of the following statement is true about archaea?
    a) Archaea resemble eukarya in all respects
    b) Archaea have some noble features that are absent in other prokaryotes and eukaryotes
    c) Archaea completely differ from both prokaryotes and eukaryotes
    d) Archaea completely differ from prokaryotes
47. The sexual stages of pathogens of blast of rice and red rot of sugarcane are named respectively as
    a) *Magneporthe grisea* and *Colletotrichum falcatum*
    b) *Colletotrichum falcatum* and *Pyricularia oryzae*
    c) *Glomerella tucmanensis* and *Magneporthe grisea*
    d) *Magneporthe grisea* and *Glomerella tucmanensis*
48. Substances secreted by bacteria are
    a) Proteins b) Toxins c) Interferons d) Antibiotics
49. Which of the following statement is correct?
    a) Viruses are obligate parasites b) All fungi are pathogenic
    c) All algae are eukaryotes d) Bacteria are always harmful to mankind
50. In five kingdom system of classification of R H Whittaker, how many kingdoms contain eukaryotes?
    a) Four Kingdoms b) One Kingdom c) Two Kingdoms d) Three Kingdoms
51. *Contagium vivum fluidum* concept of virus was proposed by
    a) DJ lvanowsky b) MW Beijerinck c) Stanley d) Robert Hooke
52. Heterothallism was discovered by
    a) Blakeslee b) Bessey c) Butler d) A Flemming
53. A place was rocky and barren but now there is a green forest, the sequence of origin is
    a) Lichen, moss, herbs, shrubs b) Moss, lichen, herbs, shrubs
    c) Lichen, moss, shrubs, herbs d) Shrubs, herbs, moss, lichen
54. The asexual spores formed by *Colletotrichum falcatum*, *Sphaerotheca* and *Rhizopus stolonifer* are
    a) Many called b) One called c) Pyriform in shape d) Rod shaped
55. Read the following statements regarding archaebacteria and select the correct option

    I. Archaebacteria differs from other bacteria in having different cell wall structure

    II. Their cell wall is made up of cellulose and contains high amount of unsaturated fatty acid, which is responsible for their survival in extreme conditions

    III. Thermoacidophiles have dual ability to tolerate high temperature as well as high acidity

    a) I and II are true b) I and III are true c) II and III are true d) I, II and III are true
56. In addition to absence of chlorophyll, what is the other difference between fungi and higher plants?
    a) Type of nutrition and composition of cell wall b) Cell type
    c) Nucleus d) Reproduction
57. Identify from the following examples, a fungus, which is of medicinal importance
    a) *Agaricus* b) *Saccharomyces* c) *Penicillium* d) *Cercospora*
58. Which one of the following pathogens causes citrus canker disease?
    a) *Meloidogyne incognita* b) *Anguina tritici*
    c) *Xanthomonas citri* d) *Pseudomonas rubilineans*
59. Kingdom-Protista includes
    a) Life cycle showing sporic meiosis b) Life cycle showing zygotic meiosis
    c) Life cycle showing gametic meiosis d) Both (b) and (c)
60. What is common about *Trypanosoma*, *Noctiluca Monocystis* and *Giardia*?
    a) These are all unicellular protists b) They have flagella

c) They produce spores
d) These are all parasites

61. Analyse the following statements and identify the correct options given below
I. Two kingdom system of classification did not distinguish between the eukaryotes and prokaryotes, unicellular and multicellular organism and green algae and fungi.
II. The two kingdom classification used for a long time was found inadequate
a) I is true, but II is false
b) I is false, II is true
c) I and II are true
d) I and II are false

62. Slime moulds in the division-Myxomycota (true slime moulds) have
a) Pseudoplasmodia
b) Spores that develop into free living amoeboid cells
c) Spores that develop into flagellated warm cells
d) Feeding stages consisting of solitary individual cells

63. The protein coat of a virus/is known as
a) Nucleoid
b) Capsid
c) Capsomere
d) Outer envelope

64. In *Amoeba*, which controls the cytoplasmic osmality?
a) Nucleus
b) Ectoplasm
c) Biurets
d) Contractile vacuole

65. The fungus without mycelium is
a) *Puccinia*
b) *Phytophthora*
c) *Rhizopus*
d) *Saccharomyces*

66. Viroids have
a) ssRNA not enclosed by protein coat
b) ssDNA not enclosed by protein coat
c) dsDNA enclosed by protein coat
d) dsRNA enclosed by protein coat

67. Which one of the following organisms is scientifically incorrectly named and incorrectly described
a) *Plasmodium falciparum*-A protozoan pathogen causing the most serious type of malaria
b) *Trypanosoma gambiense*-The parasite of sleeping sickness
c) Diatoms-Very good pollution indicators
d) *Noctiluca*-A Chrysophyte, which shows bioluminescence

68. Which one of following has haplontic life cycle?
a) *Funaria*
b) *Polytrichum*
c) *Ustilago*
d) Wheat

69. Analyse the following statements about class-Ascomycetes
I. Mycelium is branched and septate
II. The asexual spores are conidia, produced on the special mycelium called conidiophores
III. Sexual spores are called ascospores which are produced in sac like asci. These asci are arranged in same types of fruiting bodies called ascocarps
Which of the statements given above are correct
a) I and II
b) I and III
c) II and III
d) I, II and III

70. Which of the given statement best describes the gametophytic in the alternation of generation life cycle?
a) Generation that produces the gametes
b) Generation that produces the spores
c) Generation that has xylem and phloem
d) The diploid generation

71. Which of the following does not belong to the kingdom-Protista?
a) Chrysophytes
b) Euglenoids
c) Ascomycetes
d) Dinoflagellates

72. Microphagial nutrition occurs in
a) *Amphioxus*
b) Insects
c) *Paramecium*
d) *Hydra*

73. Which of the following organisms completely lack cell wall, they are the smallest living cells known and can survive without oxygen?
a) Mycoplasma
b) Euglenoids
c) Slime moulds
d) All of these

74. Bacteriophage are
a) Bacteria that attacks viruses
b) Viruses that attacks bacteria
c) Free living viruses
d) Free living bacteria

75. Which of the following is not a character of Protista?
a) Protists are prokaryotic
b) Some protists have cell walls

c) Mode of nutrition is both autotrophic and heterotrophic
d) Body organization is cellular

76. Which one of the following is a matching pair of certain organism (s) and the kind of association?
a) Shark and sucker fish – Commensalism
b) Algae and fungi in lichens – Mutualism
c) Orchids growing of trees – Parasitism
d) *Cuscuta* (dodder) growing – Epiphytism On other flowering plants

77. A bacterium divides after every 35 min, if a culture containing 10^5 cells per mL is grown, then cell concentration per mL after 175 min will be
a) 175×10^5 b) 125×10^5 c) 48×10^5 d) 32×10^5

78. The fungal partner in lichen is called mycobiont whereas algal partner is called
a) Glycobiont b) Algobiont
c) Phycobiont d) Often referred as algal partner

79. In the table below, some of the crop plants, their diseases and the pathogens are given. Match the three columns and identify the correct choice.

Crop	Disease	Pathogen
A. Pigeon pea	I. Root knot	1. *Pseudomon*
B. Brinjal	II. Ear cockle	2. *Fusarium*
C. Sugarcane	III. Wilt	3. *Anguniia*
D. Wheat	IV. Red stripe	4. *Meloidogyn*

a) A-III-2 B-I-4 C-IV-1 D-II-3
b) A-I-2 B-III-4 C-II-3 D-IV-3
c) A-IV-3 B-I-2 C-III-1 D-II-3
d) A-II-1 B-IV-3 C-I-2 D-III-4

80. In Basidiomycetes, the vegetative reproduction takes place by
a) Endospore b) Conidia c) Akinetes d) Fragmentation

81. Mention the 'Incubation Period' of *Plasmodium vivax*.
a) 10-14 days b) 20-25 days c) 30 days d) 45 days

82. The plant cell have an eukaryotic structure with prominent ...A... and cell wall is made up of ...B.... Identify the correct options for A and B to complete the given statement
a) A-chloroplast; B-cellulose
b) A-nucleus; B-chitin
c) A-chloroplast; B-lignin
d) A-nucleus; B-polysaccharide

83. Fungi lack
a) Mitochondria b) Ribosomes
c) Chloroplast d) Endoplasmic reticulum

84. Which of the following statements are false about viruses?
I. Viruses are facultative parasites
II. Viruses can multiply only when they are inside the living cells
III. Viruses cannot pass bacterial proof filters
IV. Viruses do not contains proteins DNA and RNA
Code
a) I, II and III b) II, III and IV c) I, III and IV d) I, II, III and IV

85. During unfavorable conditions, *Amoeba* reproduces through

a) Binary fission b) Sporulation c) Multiple fission d) Conjugation

86. Lomasomes are found in
a) Algal cell b) Fungal cell c) Bacterial cell d) Cyanobacterial cell

87. The genetic material of viruses consists of
a) *ds* of ss DNA only b) *ds* or ss RNA only
c) DNA or RNA (both *ds* and ss) d) ssDNA or ssRNA and

88. Which one of the following is having ssRNA?
a) TMV b) T_2 –bacteriophage c) Reovirus d) CMV

89. F-factor in bacteria is
a) plasmid b) Episome c) Colicin factor d) None of these

90. Viruses have
a) Living characteristics b) Non-living characteristics
c) Both living and non-living characteristics d) Parasitic characteristics

91. If sexual reproduction takes place between the filament of *Rhizopus* of different strains, one with 80 nuclei and another with 24 nuclei, what would be the total number of spores of different strains put together?
a) 24 b) 48 c) 96 d) 114

92. Which of the following kingdoms have no well defined boundaries?
a) Plantae b) Protista c) Monera d) Algae

93. In Deuteromycetes, the mycelium is
a) Septate and branched b) Septate and unbranched
c) Coenocytic d) Multinucleated

94. Consider the following statements
I. All prokaryotic organism were grouped together under kingdom-Monera
II. The unicellular eukaryotic organism were placed in kingdom-Protista
III. *Chlorella* and *Chlamydomonas*, both were having cell walls
IV. *Paramecium* and *Amoeba* lack cell walls
V. Kingdom-Protista has brought together *Chlamydomona*, *Chlorella* with *Paramecium* and *Amoeba*
Which of the statements give above are correct?
a) I, II, III and IV b) II, III, IV and V c) I, II, III and IV d) I, II III, IV and V

95. Regarding sexual reproduction in fungi. Which of the following statement is correct?
a) Plasmogamy followed by karyogamy
b) Karyogamy followed by plasmogamy
c) Karyogamy and plasmogamy occur together
d) Sexual reproduction is absent in fungi

96. Which of the following bacteria plays a main role in recycling the nutrients like nitrogen, phosphorus, iron and sulphur?
a) Chemoheterotrophic bacteria b) Chemosynthetic autotrophic bacteria
c) Parasitic bacteria d) Saprophytic bacteria

97. Bacteria differ from plants in that they do not have
a) DNA b) RNA
c) Cell wall d) A well define nucleus

98. Among rust, smut and mushroom, all the three
a) Are pathogens b) Are saprobes c) Bearascocarps d) Bear basidiocarps

99. All the given fungi belongs to Deuteromycetes, except
a) *Alternaria* b) *Colletotrichum* c) *Trichoderma* d) *Ustilago*

100. The body of a fungus is made up of a number of elongated, tubutar filaments called
a) Hyphae b) Woronin bodies c) Mycelium d) Thallus

101. All monerans
a) Contains DNA and RNA

b) Demonstrate a long circular strand of DNA not found enclosed in a nuclear membrane
c) Are bacteria
d) All of the above

102. Which of the following is not the locomotory organ of protozoa?
a) Cilia b) Flagella c) Parapodia d) Pseudopodia

103. Slime moulds are dependent on
a) Water plants b) Dead and decaying organic matter
c) Plants d) Weeds

104. Which of the following is a bacteriophage?
a) Bacteria infecting viruses b) Vibrio bacteria
c) Virus inhabiting in bacteria d) Cyanobacteria

105. Fungi show sexual reproduction by all of the following processes except
a) Oospores b) Ascospores c) Basidiospores d) Zoospores

106. Black rust of wheat is caused by a species of the genus
a) *Mucor* b) *Rhizopus* c) *Aspergillus* d) *Puccinia*

107. Red tides in warm coastal water develops due to the presence of
a) Dinoflagellates b) Euglenoid farms c) Diatoms and desmids d) Slime moulds

108. Black rust of wheat is a fungal disease caused by
a) *Melamspora lint* b) *Claviceps purpurea*
c) *Albugo candida* d) *Puccinia graminis tritici*

109. Bacterium having flagella with all over body is known as
a) Peritrichous b) Amphitrichous c) Monotrichous d) None of these

110. In some fungi, two haploid cells results in diploid cells. In some cases, dikaryon stage occurs in which two nuclei are present within a cell. This phase is known as
a) Monokaryophase b) Dikaryophase c) Plasmogamy d) karyogamy

111. Reproduction in most of the bacteria is by a process known as
a) Binary fission b) Budding c) Sexual d) Sporulation

112. What are episomes?
a) Hereditary DNA of bacterial cell
b) Extrachromosomal hereditary material of bacteria associated with nucleoid
c) Modification of the cell membrane performing respiration
d) None of the above

113. Identify the correct pair that shows the double stranded RNA among the following
a) Cauliflower mosaic virus and dahlia mosaic virus
b) Polio virus and wound tumour virus
c) Wound tumour virus and reovirus
d) Tobacoo mosaic virus and reovirus

114. All of the following statements concerning the actinomycetous filamentous soil bacterium *Frankia* are correct, except that *Frankia*
a) Can induce root nodules on many plant species
b) Can fix nitrogen in the free-living state
c) Like *Rhizobium*, it usually infects its host plant through root hair deformation and simulates cell proliferation in the host's cortex
d) Forms specialized vesicles, in which the nitrogenase is protected from oxygen by a chemical barrier involving triterpene hopanoids

115. Soft-rot disease of sweet potato is caused by
a) *Rhizopus stolonifer* b) *Rhizopus sexualis*
c) *Chlamydomonas nivalis* d) *Chlamydomonas coccifera*

116. Chromosomes in a bacterial cell can be 1-3 in number and
a) Can be either circular or linear, but never both within the same cell

b) Can be circular as well linear within the same cell
c) Are always circular
d) Are always linear

117. The cells of the body of a multicellular fungus are organised into rapidly growing individual filament called
a) Mycelium b) Rhizoids c) Hyphae d) Fibrins

118. The non-living characteristic of viruses is
a) Ability to multiply only inside the host
b) Ability to cause diseases in the host
c) Ability to undergo mutation
d) Ability to be crystallize

119. Which of the following bacteria are responsible for the production of biogas from the dung of cows and buffaloes?
a) Thermoacidophiles
b) Halophiles
c) Methanogen
d) Cyanobacteria

120. In *Amoeba*, the contractile vacuole is present
a) Near the trailing end
b) Near the advancing end
c) At the middle of the body
d) Anywhere inside the body

121. Which of the following environmental conditions are essential for optimum growth of *Mucor* on a piece of bread?
I. Temperature of about 25°C
II. Temperature of about 5°C
III. Relative humidity of about 5%
IV. Relative humidity of about 95%
V. A shady place
VI. A brightly illuminated place
a) I, III and V b) I, IV and V c) II, IV and V d) II, III and VI

122. Which one is the free-living, anaerobic nitrogen-fixer?
a) *Beijernickia* b) *Rhodospirillum* c) *Rhizobium* d) *Azotobacter*

123. Edible part of mushroom is
a) Basidiocarp
b) Primary mycelium
c) Fungal hyphae
d) Basidiospores

124. Which of the following is a symbiotic nitrogen fixer?
a) *Glomus* b) *Azotobacter* c) *Frankia* d) *Azolla*

125. Viruses contain
a) Only RNA b) Only DNA c) Either DNA or RNA d) Neither DNA nor RNA

126. In the five kingdom classification, *Chlamydomonas* and *Chlorella* are included in
a) Plantae b) Algae c) Protista d) Monera

127. The accumulated food reserve in fungi is
a) Protein b) Starch c) Glycogen d) Fat

128. Yeast is not included in protozoans but in fungi because
a) It has no chlorophyll
b) Some fungal hyphae grow in such a way that they give the appearance of psuedomycelium
c) It has eukaryotic organisation
d) Cell wall is made up of cellulose and reserve food material as starch

129. The genetic material of AIDS virus is
a) Double stranded DNA b) Double stranded RNA c) Single stranded RNA d) Single stranded DNA

130. The benefit of algae in lichen is
a) Food for fungi
b) Shelter
c) Mineral absorption
d) Protection

131. Which of the following groups belongs to protozoans?
a) Amoeboid, flagellates, ciliates, sporozoans
b) Diatoms, amoeboid, ciliates, sporozoans

c) Desmids, ciliates, flagellates, amoeboid
d) Dinoflagellates, ciliates, *Plasmodium*, amoeboid

132. A virus differs from a bacterium as it contains
a) A cell wall
b) Cytosol
c) DNA as genetic material
d) DNA or RNA as genetic material with no ribosomes

133. Viral genome incorporated into host DNA is called
a) Prophase
b) Prophage
c) Bacteriophage
d) None of these

134. Maximum number of antibiotics are obtained from
a) Fungi
b) Bacteria
c) Virus
d) Plants

135. Animals reserve food material in the form of
a) Glycogen or animal fat
b) Glucose
c) Cellulose
d) Chitin

136. Which of the following protects the bacteria from the enzymes present in the external medium?
a) Slime layer
b) S-layer
c) Flagella
d) Cell wall

137. Concerning general characteristic of plants, which statement is correct
I. Some of these may be partially heterotrophic as in case of insectivorous plants line Venus fly trap
II. They have distinct nucleus, chloroplast and chitinous cell wall
a) Only I
b) Only II
c) I and II
d) None of these

138. The smallest free-living organism is
a) Virus
b) Mycoplasma
c) Diatom
d) Cyanobacterium

139. The symbiotic relationship between fungi and algae is called
a) Lichen
b) Mycorrhiza
c) Helotism
d) Mutualism

140. A term 'helotism' is used for the symbiosis of
a) Algae and fungi
b) Algae and *Cycas*
c) Algae and bacteria
d) *Pinus* and fungi

141. Chitin is present in the cell wall of
a) Fungi
b) Bacteria
c) Yeast
d) Algae

142. St. Anthony's fire disease is caused by
a) Bacteria
b) Fungus
c) Nematodes
d) Polychaete

143. In *Plasmodium*, signet ring stage us formed during
a) Exo-erythrocytic schizogony
b) Erythrocytic schizogony
c) Sporogony
d) Gamogony

144. Common cold is a
a) Bacterial disease
b) Viral disease
c) Protozoan disease
d) Fungal disease

145. Viroids were discovered by
a) TO Diener
b) DJ Ivanowsky
c) MW Beijerinck
d) WM Stanley

146. Plants provide protection from fungal disease by producing
a) Protoxins
b) Prolectins
c) Phytoalexins
d) All of these

147. Who crystallised and isolated viruses for the first time?
a) WM Stanley
b) FC Bawden
c) KM Smith
d) DJ lvanowsky

148. Heating milk at 65°C followed by sudden cooling is known as
a) Sterilization
b) Preservation
c) Pasteurization
d) Fermentation

149. Select incorrect pair.
a) Porifera – choanocytes
b) Coelenerata – eukaryote
c) Annelida– segmentation
d) Monera – eukaryote

150. Who proposed five kingdom classification and named kingdoms as Monera, Protista, Fungi, Plantae and Animalia?
a) Herbert Copeland
b) R H Whittaker
c) Carl Woese
d) Carolus Linnaeus

151. Analyse the following statements regarding cyanobacteria and identify the correct option given below
I. The cyanobacteria are unicellular, colonial or filamentous, marine or terrestrial algae
II. The colonies of cyanobacteria are generally surrounded by gelatinous sheath
Codes
a) Only I b) Only II c) I and II d) None of these

152. Some bacteria utilises inorganic substances like nitrate, nitrite, ammonia, etc., for the oxidation and release of energy for ATP production. These are known as
a) Cyanobacteria b) Chemosynthetic autotrophic bacteria
c) Heterotrophic bacteria d) Saprophytic bacteria

153. VAM is
a) Symbiotic bacteria b) Saprophytic bacteria
c) Saprophytic fungi d) Symbiotic fungi

154. Ascomycetes is commonly known as
a) Toad stool b) Sac fungi
c) Imperfect fungi d) Bracket fungi

155. Protozoans are
a) Heterotrophs b) Autotrophs c) Producer d) Saprophytes

156. The parthenospores of *Rhizopus* are
a) Uninucleate b) Binucleate c) Trinucleate d) Multinucleate

157. Bacteria do not have
a) Ribosome b) Protein synthesizing apparatus
c) Mitochondria d) Cell wall

158. Viruses and viroids are the non-cellular organisms, which are not characterised in the classification of
a) Whittaker b) Aristotle c) Linnaeus d) Watson

159. Which of the following is correct matched?
a) Humus – Abiotic component b) *Rhizobium* – Free-living nitrogen fixer
c) Phosphorus cycle – Sedimentary d) *Shorea robusta* – Tropical deciduous forest

160. Which of these best describes the saprophytic generation in plant's life cycle?
a) The haploid generation b) Generation that produces the gametes
c) Generation that produces spores d) Generation that has xylem and phloem

161. The type of nutrition, where organisms engulf food materials, is?
a) Saprozoic b) Autotrophic c) Holozoic d) Saprophytic

162. Fruiting body of *Penicillium* is
a) Cleistothecium b) Pycniophysis c) Sterigmata d) None of these

163. Which statement is correct for bacterial transduction?
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 obtain DNA directly
d) Bacteria obtain DNA from other external source

164. Contractile vacuole is absent in
a) Sporozoa b) Sarcodina c) Zooflagellate d) Slime moulds

165. Mycorrhiza are mutualistic and have symbiotic associations between
a) Fungi and vascular plants
b) fungi and non-vascular plants
c) Fungi and roots of higher plants
d) Fungi and bryophytes

166. Lichen are mutualistic and have symbiotic associations between
a) Fungi and virus b) Fungi and algae
c) Fungi and root of higher plants d) Fungi and mosses

167. An eukaryote, which causes disease comes under

a) Moneran b) Fungus c) Virus d) None of these

168. Curing of tea is brought about by the activity of
a) Bacteria b) Mycorrhiza c) Viruses d) Fungi

169. The first attempt to classify organisms on scientific basis was done by
a) Copeland b) Aristotle c) Linnaeus d) Whittaker

170. Plants have a/an..... in their life cycle
a) Sexual phase only b) Asexual phase only
c) Alternation of generations d) Haplontic

171. Bacterial flagella is made up of
a) Protein b) Amines c) Lipids d) Carbohydrates

172. Consider the following statements and place them into true and false category
I. The fungi constitutes a unique kingdom of heterotrophic organisms
II. The common mushroom and toad stools are fungi
IIII. White spots seen on mustard leaves are due to presence of parasitic fungus
IV. Some unicellular fungi (*Ustilago*) are used to make bread and beer
V. *Puccinia graminis tritici* is responsible for yellow rust of wheat
VI. *Penicillium* yields the antibiotic penicillin

True **False**
a) I, II, III IV, V, VI b) I, II, III,VI IV, V
c) II, III, VI I, IV, V d) IV, V I, II, IIII, VI

173. There exists a close association between the alga and the fungus withina lichen. The fungus
a) Fixes the atmospheric nitrogen for the alga
b) Provides protection, anchorage and absorption for the alga
c) Provides food for the alga
d) Releases oxygen for the alga

174. Which is false for nutrition in *Amoeba*?
a) Omnivorous b) Pseudopodia feeder c) Holozoic nutrition d) Photoautotroph

175. Bacterial flagella do not show ATPase activity and 9+2 organization. These are chemically formed of
a) Flagellin b) Pilin c) Tubulin d) Bacterin

176. Viruses did not find a place in classification since
a) They are not truely living b) They are non-cellular
c) They are obligate parasite d) They are pathogenic

177. Certain bacteria living in the soil poor in oxygen, convert nitrates into nitrites and then to free nitrogen and such bacteria are termed as
a) Nitrogen fixing bacteria b) Denitrifying bacteria
c) Ammonifying bacteria d) Saprophytic bacteria

178. All are the viral diseases except
a) AIDS and mumps b) Smallpox and herpes
c) Influenza d) Anthrax

179. ..... give the name virus, which means venom or poisonous fluid
Fill in the blank
a) Pasteur b) MW Beijerinck c) Stanley d) Robert Hook

180. Which is correct?
a) Slime moulds are haploid. b) Protozoans lack cell wall.
c) Dinoflagellates are immotile. d) Pellicle is absent in *Euglena*.

181. Which one of the following does not grow in artificial media?
a) TMV b) Bacteria c) Yeast d) *Rhizopus*

182. Silica gel is obtained by
a) Red algae b) Diatoms c) *Euglena* d) Mycoplasma

183. Which pair of the following belongs to Basidiomycetes?

a) Birds nest fungi and puffballs
b) Puffballs and *Claviceps*
c) *Peziza* and stink horns
d) *Morchella* and mushrooms

184. In which of the following kingdoms, diatoms are placed?
a) Plantae b) Fungi c) Protozoa d) Protista

185. The wall of bacteria consist of
a) N-acetylglucosamine
b) N-acetyl muramic acid
c) Both (a) and (b)
d) Cellulose

186. I. *Noctiluca* is a colourless dinoflagellates, which is an important constituent of coastal plankton of both temperate and tropical seas
II. The cellular slime moulds have the characters of both plants and animals
Which of the statements given above is/ are correct?
a) Only I b) Only II c) I and II d) None of the above

187. VAM is useful for
a) Phosphate nutrition
b) Breaking of dormancy
c) Decrease in diseases
d) Retarding flowering

188. Which of the following group always produce an infectious spore like stage in their life cycle?
a) Amoebiod protzoans
b) Ciliated protozoans
c) Flagellated protozoans
d) Sporozoans

189. Which mushroom contains muscarine?
a) Agaricus bisporus
b) Volveriella volvacea
c) Pleurotus sojar
d) Amanita virosa

190. Consider the following statements
I. Fruce discovered that the parasite of sleeping sickness is transmitted by tse-tse fly
II. Sleeping sickness of *Trypanosoma gambiens* is also called Gambian trypanoomiasis, which is found in western and central parts of Africa
III. *Trichomonas vaginalis* inhabits vagina of women and causes the disease leucorrhoea
IV. *Entamoeba histolytica* resides in the upper part of the human large intestine and cause the disease known as amoebic dysentery
Which of the statements given above are correct?
a) I, II and III b) II, III and IV c) I, II and IV d) All of these

191. Protozoans are divided into..... groups. Most suitable word to fill the blank is
a) Three b) Four c) Two d) Eight

192. Fungi differs from slime moulds by lacking of
a) Flagellated spores b) Ascospores c) Basidiospores d) Zygospores

193. Isogamous means
a) Similar in morphology
b) Similar in anatomy
c) Similar in morphology female gamete is bigger than male gamete
d) Similar in morphology male gamete is bigger than male gamete

194. Viruses posses
a) DNA only
b) Nucleic acid, DNA or RNA
c) Protein only
d) Nucleic acid and protein

195. Members of Ascomycetes are
a) Sporophytic
b) Decomposers
c) Parasitic or coprophilous
d) All of these

196. A bacterium is capable of with standing extreme heat, dryness and toxic chemicals. This indicates that it is probably above to form
a) A thick peptidoglycan wall
b) Endospores
c) Endotoxins
d) Endogenous buds

197. Bacterial blight of rice is caused due to

a) *Xanthomonas oryzae* b) *Helminthosporium oryzae*
c) *Pseudomonas falcatum* d) *Xanthomonas falcatum*

198. In the following table, identify the correct matching of the crop, its disease and the corresponding pathogen.

Crop	Disease	Pathogen
a) Citrus	Canker	*Pseudomonas rubrilineans*
b) Potato	Late blight	*Fusarium udum*
c) Brinjal	Root knot	*Meloidogyne incognita*
d) Pigeon pea	Seed gall	*Phytophthora infestans*

199. Which of the following pairs of bacteria is involved in two step conversion of NH_3 into nitrate?
a) *Azotobacter* and *Nitrosomonas* b) *Nitrosomonas* and *Nitrobacter*
c) *Azotobacter*and *Achromobacter* d) *Pseudomonas* and *Nitrobacter*

200. Insectivorous plants are principally
a) Autotrophic b) Heterotrophic c) Parasitic d) Pathogenic

201. Bacteria with single flagella at one end is called
a) Monotrichous b) Lophotrichous c) Amphitrichous d) Peritrichous

202. Passive food ingestion in *Amoeba* is known as
a) Import b) Invagination c) Circumfluence d) Circumvallation

203. Which one of the following combinations of microbes is responsible for the formation and flavor of yoghurt?
a) *Lactobacillus casei* and *Streptococcus thermophillus*
b) *Rhizobium meliloti* and *Azotobacter* sp
c) *Edoboiquerilluers ruburn* and *Sciencealla typhosa*
d) *Bacillus subtilis* and *Escherichia coli*

204. Which of the following is an unicellular sac-fungus?
a) *Claviceps* b) *Saccharomyces* c) *Penicillium* d) *Neurospora*

205. Find out the correct statement
a) In lichens, the algal components is called phycobiont and fungal component is known as mycobiont, which are heterotrophic and autotrophic respectively
b) Viroid contains RNA of low molecular weight and protein coat
c) A virus contains both RNA and DNA
d) Viruses are obligatory parasites

206. In which of the following groups, the cell wall has stiff cellulose plate on the outer surface?
a) Diatoms b) Red algae c) Dinoflagellates d) Slime moulds

207. Which one of the following are intracellular obligate parasites?
a) Bacteria b) Viruses c) Slime moulds d) Blue-green algae

208. Lichen is the association of
a) Protista and algae b) Fungi and bacteria c) Protista and fungi d) Algae and fungi

209. A type of life cycle in which plasmogamy, karyogamy, haplodization takes place but not at specific place in life cycle of an organism is called as
a) Parasexuality b) Heterozygosity c) Homozygosity d) Asexuality

210. Which of the following statements about plant is false?
a) Plants are heterotrophic
b) Plants have an alternation of generation life cycle
c) Plants are multicellular eukaryotes
d) Plants are non-motile

211. Consider the following statements
I. Biological classification is the scientific ordering of organisms in a hierarchial series of groups on the basis of their relationships, *i.e.*, morphological, evolutionary and others
II. Whittaker classified organisms on the basis of autotrophic and heterotrophic mode of nutrition

III. In five kingdom system of classification, living organisms can be divided into prokaryotic and eukaryotic cells on the basis of cell structure

Which of the statements given above are correct?

a) I and II b) I and III c) II and III d) I, II and III

212. ds RNA is found in

a) Reovirus b) TMV c) $\phi \times 174$ d) None of these

213. Fungi in a forest ecosystem is

a) Producer b) Decomposer c) Top consumer d) Autotroph

214. Lysozyme that is present in saliva and tears destroys

a) Certain fungi b) Certain types of bacteria

c) All viruses d) Most virus infected cells

215. Which of the following statement is correct?

a) In *Cycas*, megasporophyll produce pollen grains

b) In *Agaricus*, gills produce basidiospores

c) In *Aspergillus*, fruiting body is perithecium

d) In *Funaria*, capsule represents gametophytic generation

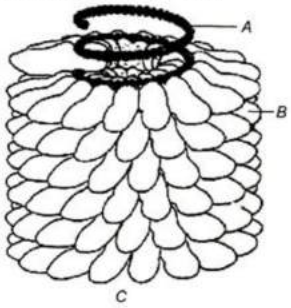
216. Which of the following are the commonly known forms of Basidiomycetes?

a) Mushrooms b) Puffball c) Bracket fungi d) All of these

217. Fungus/lichen, which grows on wood is

a) Terricolous b) Saxicolous c) Lignocolous d) Corticolous

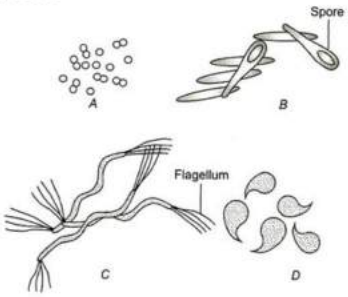
218. Given below is the diagram of a virus. In which one of the options, all the three *A*, *B* and *C* (name of the virus) are correct?



a) A-RNA, B-Capsomere, C-TMV b) A-DNA, B-Capsid, C-Bacteriophage

c) A-RNA, B-Capsid, C-Tobacco mosaic virus d) A-DNA, B-Capsid, C-Bacteriophage

219. Bacteria are grouped under four categories based on their shape. Study the given figure and identify *A*, *B*, *C* and *D*



a) A-Vibrio, B-Cocci, C-Bacilli, D-Spirilla b) A- Cocci, B-Bacilli, C-Spirilla, D-Vibrio

c) A-Bacilli, B-Spirilla, C-Vibrio, D-Cocci d) A-Spirilla, B-Vibrio, C-Cocci, D-Bacilli

220. Which of the following fungus is used extensively in biochemical and genetic work?

a) *Neurospora* b) *Mucor* c) *Rhizopus* d) *Aspergillus*

221. Which is the hereditary material in bacteria?

a) Nucleic acid b) Nucleic acid and cytoplasm

c) Nucleic acid and histone d) None of the above

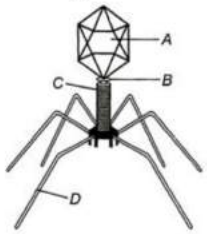
222. Which statement is incorrect?
a) Plant virus contains RNA
b) Animal virus contains DNA
c) T_4 contains dsDNA
d) TMV contains dsRNA

223. Identify the fungus, which produces chlamydospores from dikaryotic mycelium.
a) *Sphacelotheca sorghii*
b) *Rhizops stolonifer*
c) *Pyricularia oryzae*
d) *Colletotrichum falcatum*

224. Litmus is obtained from
a) Bacteria
b) Fungi
c) Algae
d) Lichen

225. Genophore term was coined by Hans Ris for
a) Genetic material of virus
b) Stack on which spore originated
c) Bacterial chromosome
d) Fungal chromosome

226. Identify the label A, B, C and D in the following figures



Codes
a) A-Head, B-collar, C-Sheath, D-Tail fibres
b) A-Collar, B-Head, C-Sheath, D-Tail fibres
c) A-Head, B-Collar, C-Tail fibres, D-Sheath
d) A-Collar, B-Tail fibres, C-Head, D-Sheath

227. Cell wall of fungi is made up of
a) Fungal cellulose
b) Hemicellulose
c) Fungal chitin
d) Both (a) and (c)

228. The cell wall of bacterium is made up of
a) Cellulose
b) Hemicellulose
c) Lignin
d) Peptidoglycan

229. Which of the following do not secrete toxins during the storage conditions of crop plants?
a) *Aspergillus*
b) *Penicillium*
c) *Fusarium*
d)

230. Which of the following processes needs bacteriophage?
a) Transduction
b) Translation
c) Transformation
d) Conjugation

231. Bacteria are found in
a) Soil
b) Hot springs
c) Desert and snow
d) Everywhere

232. Eubacteria have rigid cell wall made up of
a) Murein
b) Peptidoglycan
c) Cellulose
d) Chitin

233. Cell wall of Gram positive bacteria is made up of
a) Murein
b) Cellulose
c) Lipid and protein
d) Cellulose and lipid

234. Which of the following are symbiotic bacteria?
a) *Rhizobium*
b) *Azotobacter*
c) *Clostridium*
d) *Streptomyces*

235. Bacterium which reduces nitrates in soil to nitrogen is
a) *Nitrosomonas*
b) *Pseudomonas*
c) *Rhizobium*
d) *Clostridium*

236. Nitrifying bacteria are able to
a) Convert atmospheric nitrogen into soluble forms
b) Convert ammonia to nitrate
c) Ammonia to nitrogen
d) Nitrate to nitrogen

237. Dinoflagellates are mostly ....A... and ...B.... Here A and B refers to

a) A-freshwater, B-chemosynthetic
b) A-marine, B-photosynthetic
c) A-terrestrial; B-photosynthetic
d) A-marine; B-chemosynthetic

238. Consider the following statements
I. Diatomite is porous and chemically inert. It is therefore, used in filtration of sugar, alcohols, oils, syrups and antibiotics
II. Diatomite deposits are often accompanied by petroleum fields
III. Desmids are mainly found in dirty water and are, usually indication of polluted water
Which of the statements given above are correct?
a) I and II
b) I and III
c) II and III
d) I, II and III

239. The deadliest mushroom is
a) *Agaricus*
b) *Amanita*
c) *Pleurotus*
d) *Volveriella*

240. Arrange the following in correct sequence with reference to sexual reproduction in *Rhizopus*.
I. Formation of germ tube
II. Formation of zygophores
III. Formation of warty wall layer of zygospore
IV. Secretion of trisporic acid
a) IV, III, II and I
b) IV, II, III and I
c) II, I, IV and III
d) I, III, II and IV

241. Virus envelope is known as
a) Capsid
b) Virion
c) Nucleoprotein
d) Core

242. The chief advantages of encystment of an *Amoeba* is
a) Protection from parasites and predators
b) The chance to get rid of accumulated waste products
c) The ability to survive during adverse physical conditions
d) The ability to live sometime without ingesting food

243. Bacteria are helpful in
a) Making curd from milk
b) Production of antibiotics
c) Fixing nitrogen in legume roots
d) All of the above

244. Zygospore is
a) Give rise to zoospores on meiosis
b) Equivalent of Ascus, *Brasilia*
c) Dormant stage
d) Give rise to asexual spore

245. Pigment present in cyanobacteria is
a) r- phycocyanin
b) r-phycocerythrin
c) c-phycocyanin
d) Anthocyanin

246. The Gram negative bacteria detect and respond to chemicals in their surrounding by
a) Lipopolysaccharide
b) Muramic acid
c) Porins
d) Volutine granules

247. Which of the following combinations of characters is true for slime moulds?
a) Parasitic, plasmodium with true walls, spores dispersed by air currents
b) Saprophytic, plasmodium without walls, spores dispersed by water
c) Parasitic, plasmodium without walls, spores dispersed by water
d) Saprophytic, plasmodium without walls, spores dispersed by air currents

248. During unfavourable conditions, slime mould forms ...A... which are ...B... and survive for many years
Identify A and B to complete the given statement
a) A-zoospores; B-round is shape
b) A-endospores; B-hexagonal in shape
c) A-akinetes; B-highly resistant
d) A-spores; B-highly resistant

249. Term 'virus' means
a) Cellular
b) Pathogen
c) Parasite
d) Venom or poisonous fluid

250. Protein coat of a virus enclosing nucleic acid is called
a) Plasmid
b) Capsid
c) Vector
d) Genome

251. Which of the following is not matched correctly
a) *Anabaena* – Cyanobacteria
b) *Amoeba* – Protozoa

c) *Gonyaulax* – Dinoflagellated d) *Albugo* –Chrysophytes

252. Which of the following unicellular organism has a macro-nucleus for trophic function and one or more micro-nuclei for reproduction?
a) *Euglena* b) *Amoeba* c) *Paramecium* d) *Trypanosoma*

253. In Phycomycetes, asexual reproduction takes place by zoospores or by aplanospores. Regarding these spores, consider the following statements and choose the correct option
I. Zoospores are motile and aplanospores are non-motile in nature
II. These spores are endogenously produced in sporangium
Which of the statements are true and false?
a) I is true, but II is false b) I is false, but II is true c) I and II are true d) I and II are false

254. Dikaryophase of fungus occurs in
a) Ascomycetes and Basidiomycetes b) Phycomycetes and Acomycetes
c) Phycomycetes and Basidiomycetes d) Basidiomycetes and Deuteromycete

255. The infective stage of *Entamoeba histolytica*, is
a) Trophozoite stage b) Binucleated cyst stage
c) Tetranucleated cyst stage d) None of the above

256. Which of the following class consists of coenocytic, multinucleate and aseptate mycelium?
a) Basidiomycetes b) Ascomycetes c) Phycomycetes d) Deuteromycetes

257. The basic unit of chitin is
a) N-acetylglucosamine b) Glucose c) Galactose d) Fructose

258. Heterotrophic bacteria are dependent on other organism for
a) Excretion b) Nutrition c) Digestion d) Fission

259. Sexual reproduction is present in all fungi classes, except
a) Ascomycetes b) Phycomycetes
c) Basidiomycetes d) Deuteromycetes

260. Free living, aerobic, non-photosynthetic, nitrogen fixing bacterium is
a) *Azotobacter* b) *E. coli* c) *Nostoc* d) *Salmonella*

261. Kingdom-Animalia includes
a) Heterotrophic organisms b) Eukaryotic organisms
c) Multicellular organism d) All of these

262. Black stem rust of wheat is caused by
a) Fungi b) Protozoa c) Algae d) Bacteria

263. Which one is wrong pairing for the disease and its casual organism?
a) Late blight of potato – *Alternaria solani* b) Black rust of wheat – *Puccinia graminis*
c) Loose smut of wheat – *Ustilago nuda* d) Root knot of vegetables – *Meloidogyne* sp.

264. A 'T-series bacteriophage' can be recognized by its
a) Tadpole shape b) Rounded shape c) Irregular shape d) Rhomboidal shape

265. Which of the following is a bacterial disease?
a) Rust of wheat b) Potato leaf roll c) Sugarcane mosaic d) Brown rot of potato

266. Slime moulds are
a) Phathogenic b) Parasite c) Saprophytic protists d) Autotrophic

267. Mode of feeding in free living protozoan, is
a) Holozoic b) Saprozoic c) Both (a) and (b) d) None of these

268. The protein coat of virus is called capsid, which is made up of small sub-units called ...A... which protects the ...B...
Identify A and B and complete the given statement
a) A-capsomeres, B-nucleic acid b) A-collar, B-cytoplasm
c) A-outer envelope, B-nucleus d) A-inner envelope, B-nucleic acid

269. In Whittaker's system of classification prokaryotes are placed in the kingdom
a) Protista b) Monera c) Plantae d) Animalia

270. Which of the following animals is having longitudinal binary fission?
a) *Euglena* b) *Plasmodium* c) *Planaria* d) *Paramecium*

271. Select the incorrect match
a) Morels and truffle – Phycomycetes
b) Mushrooms and puffballs – Basidiomycetes
c) Smut and rust – Basidiomycetes
d) Bread mould – Phycomycetes

272. Chloromycetin is obtained from
a) *Saccharomyces cerevisiae* b) *Streptomyces venezualae*
c) *Streptomyces griseus* d) *Streptomyces erythraeus*

273. I. Commonly known as sac-fungi
II. Mycelium is branched and septate
III. Conidiophore produces conidia exogenously in chain
IV. The fructifications are edible and considered delicacies
V. *Neurospora crassa* is often employed in studies conducted in experimental genetics
The above statements are assigned to
a) Ascomycetes b) Phycomycetes c) Basidiomycetes d) Deuteromycetes

274. Sac fungi includes
a) *Penicillium* and yeast b) *Ustilago* and *Puccinia*
c) *Alternaria* and *Trichoderma* d) *Colletotrichum* and yeast

275. An example for plant growth promoting rhizobacterium, which produces iron chelating substances, is
a) *Pseudomonas putida* b) *Rhizobium japonicum*
c) *Aspergillus flavus* d) *Azospirillum*

276. The protistan cell body contains
I. a well defined nucleus
II. membrane bound cell organelles
III. flagella or cilia
Correct statement among those written above is
a) I and II b) I and III c) II and III d) I, II and III

277. Membrane-bound organelles are absent in
a) *Saccharomyces* b) *Streptococcus* c) *Chlamydomonas* d) *Plasmodium*

278. Lactic acid formation is a two steps anaerobic process. Both steps are carried at one stage by
a) *Streptococcus* b) *Rhizopus* c) *Lactobacillus* d) *Aspergillus*

279. In protozoans like *Ameoba* and *Paramecium*, which of the following organelle is found for osmoregulation?
a) Contractile vacuole b) Mitochondria c) Nucleus d) Food vacuole

280. Severe Acute Respiratory Syndrome (SARS)
a) Is caused by a variant of *Pneumococcus pneumoniae*
b) Is caused by a variant of the common cold virus (corona virus)
c) Is an acute form of asthma
d) Affects non-vegetarians much faster than the vegetarians

281. Type of sexual reproduction in protists, bearing diploid chromosome is
a) Zygotic meiosis b) Binary fission
c) Cyst formation d) Gametangial meiosis

282. Which is responsible for recycling of material?
a) Bacteria b) Algae c) Protista d) Virus

283. Which is correct for the structure of cell wall of bacteria and fungi?
a) Both are made up of cellulose b) Both have mucopeptide
c) Both are made up of N-acetylglucosamine d) None of the above

284. Some hyperthermophilic organisms that grow in highly acidic (pH2) habitats belong to the two groups

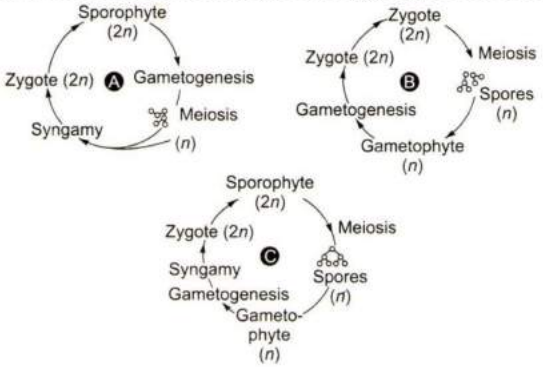
a) Eubacteria and archaea
b) Cyanobacteria and diatoms
c) Protists and mosses
d) Liverworts and yeasts

285. In plants, mosaic formation, leaf rolling and curling yellowing and vein clearing are the symptoms of
a) Viral diseases
b) Bacterial diseases
c) Protozoan diseases
d) Fungal diseases

286. Early leaf spot disease in *Arachis hypogea* is caused due to infection of
a) *Cercospora personata*
b) *Gibberella fujikuroi*
c) *Agrobacterium tumefaciens*
d) *Phytophthora infestans*

287. Which of the following are correct to describe viruses?
I. Simple and unicellular organism.
II. Contain DNA or RNA and enclosed by protein coat.
III. Possess own metabolic system and respond to stimuli.
IV. Maintain genetic continuity and undergo mutations.
The correct combination is
a) I and II
b) II and IV
c) II and III
d) I and III

288. Which of the following correctly represents the type of life cycle patterns from the options given?



a) A-Diplontic B-Haplodiplontic C-Haplontic
b) A-Haplodiplontic B-Haplontic C-Diplontic
c) A-Haplontic B-Diplontic C-Haplodiplontic
d) A-Diplontic B-Haplontic C-Haplodiplontic

289. *Plasmodium* is a
a) Ciliated protozoans
b) Sporozoan
c) Flagellated protozoans
d) Amoeboid protozoans

290. Life cycle of *Plasmodium* is
a) Monogenetic
b) Digenetic
c) Trigenetic
d) Polygenetic

291. Contractile vacuole in protozoan *Amoeba* is ment for
a) Respiration
b) Excretion
c) Locomotion
d) Osmoregulation

292. Some bacteria thrive extreme environment conditions such as absence of oxygen, high salt concentration, high temperature and acidic pH. Identify the type of bacteria
a) Cyanobacteria
b) Eubacteria
c) Archaebacteria
d) Mycobacteria

293. *Trypanosoma* causes
a) Sleeping sickness
b) Cholera
c) Malaria
d) Food poisoning

294. Secondary mycelium of mushroom produces umbrella like structure called as
a) Primary mycelium
b) Tertiary mycelium
c) Pileus
d) Gills

295. Assign the following substances to the cell wall, flagella, 'S' layer and pilli of bacteria in correct sequence.
I. Glycoprotein
II. Fimbrilin
III. Teichoic acid
IV. Flagellin
The correct sequence is
a) III, I, IV, II
b) III, IV, I, II
c) II, IV, III, I
d) III, IV, II, I

296. Covered smut of barley is caused by

a) *Ustilago hordei* b) *Tilletia caries*
c) *Ustilago nuda* d) *Colletotrichum falcatum*

297. The latest view for the origin of viruses is
a) These have arisen from nucleic acid and protein found in primitive soup
b) These arose from some bacteria as a result of the loss of cell wall, ribosome, etc
c) These arose from some bacteria, which had developed a nucleus only
d) These are modified plasmids, which are infact the fragments of the nucleic acids of the host

298. Mesosome in a bacterial cell is
a) Plasmid b) Connection between two cells
c) Plasma membrane infolded for respiration d) None of the above

299. Provirus is
a) A free virus b) Primitive virus
c) Integrated viral genome d) A free DNA

300. *Cuscuta* is a
a) Parasite b) Pathogen c) Saprophytic d) Fungus

301. Single stranded nucleic acid is found in
a) *E. coil* b) $\phi \times 174$ c) λ d) T_4

302. Mushroom belongs to
a) Ascomycetes b) Basidiomycetes c) Phycomycetes d) Zygomycetes

303. In cyanobacteria, which of the following is present?
a) Chlorophyll-*c* b) Chlorophyll-*b* c) Chlorophyll-*a* d) Chloropyll-c_1

304. Which of the following group is considered to be primitive relatives of animals?
a) Chrysophytes b) Protozoans c) Euglenoids d) Slime moulds

305. Which is not related with N_2-fixation?
a) *Anabaena* b) *Rhizobium* c) *Pseudomonas* d) *Nostoc*

306. *Plasmodium*
a) Is a malarial parasite b) Is a filarial parasite
c) Causes sleeping sickness d) Causes food poisoning

307. Bakanae disease is caused by
a) Fungus b) Alga c) Bacterium d) Virus

308. The common nitrogen-fixer in paddy fields is
a) *Rhizobium* b) *Azospirillum* c) *Oscillatoria* d) *Frankia*

309. Man in the life cycle of *Plasmodium*, is
a) Primary host b) Secondary host c) Intermediate host d) None of these

310. Fungi show asexual reproduction by all of the following kinds of spores except
a) Conidia b) Oospore c) Sporangiospore d) Zoospores

311. The genome of bacteriophage can be
a) DNA only b) RNA only
c) Both DNA and RNA d) Either DNA or RNA

312. Mycorrhiza promotes plant growth by
a) Absorbing inorganic ions from soil
b) Helping the plant in utilizing atmospheric nitrogen
c) Protecting the plant from infection
d) Serving as plant growth regulator

313. Ergot of rye is caused by a species of
a) *Phytophthora* b) *Uncinula* c) *Ustilago* d) *Claviceps*

314. Flagellate protozoans are
a) Free living only b) Parasites only
c) Either free living or parasites d) Saprophytes

315. Pasteurization is

a) Heating of liquid at 65°C
b) Heating of liquid between 65°C to 80°C followed by rapid cooling
c) Heating of solid at 65°C
d) None of the above

316. A bacterium which is capable of utilizing the most abundantly available gas in the atmosphere for one of its metabolic pathways, but cannot utilize the second most abundantly available for its another metabolic pathway is
a) *Azotobacter* b) *Clostridium* c) *Rhodomicrobium* d) *Xanthomonas*

317. In fungi, the various types of spores are produced in distinct structures known as
a) Fruiting body b) Spore sac c) Peristome d) Pollen sac

318. Which one of the following is wrongly matched?
a) *Puccinia*– Smut
b) Root – Exarch protoxylem
c) *Cassia*– Imbricate aestivation
d) Root pressure – Guttation

319. Mosaic disease in tobacco is due to
a) Bacteria b) Virus c) Mycoplasma d) Algae

320. Mushroom belongs to class
a) Phycomycetes b) Zygomycetes c) Basidiomycetes d) Deuteromycetes

321. Which of the following pair belongs to the class-Basidiomycetes?
a) Birds nest fungi and puffballs
b) Puffballs and *Claviceps*
c) *Peziza* and stink horns
d) *Morchella* and mushrooms

322. Chief producers in oceans are
a) Golden brown algae
b) Diatoms
c) Dinoflagellates
d) Eugleoids

323. Bacteria are considered plants because they
a) Are green in colour b) Have rigid cell wall c) Have chlorophyll d) Have stomata

324. Red rot of sugarcane is caused by
a) *Colletotrichum falcatum*
b) *Phytophthora infestans*
c) *Ustilago nuda*
d) *Alternaria solani*

325. In fungi, the network of hyphae is known as
a) Hypha b) Fibrins c) Mycelium d) *Plasmodium*

326. Red rot of sugarcane and white rust of radish are respectively caused by
a) *Albugo candida* and *Cercospora*
b) *Collectotrichum* and *Fusarium*
c) *Pythium* and *Phytophthora*
d) *Colletotrichum* and *Albugo candida*

327. Identify the diseases that are caused by the organisms of the same sub-division of Eumycota.
I. Citrus canker
II. Red rot of sugarcane
III. Grain smut of sorghum
IV. Black neck of rice
a) I and IV b) I and III c) II and III d) II and IV

328. Bacteria which survive in marshy areas and also present in the gut of many ruminant animals like cows and buffaloes are
a) Halophiles
b) Basophiles
c) Thermoacidophiles
d) Methanogens

329. In which of the following organisms the cell wall is composed of two thin overlapping shells which fits together like a soap case
a) Diatoms b) Golden algae c) Slime moulds d) *Gonyaulax*

330. Which of the following statements about *Euglena* is true?
a) Euglenoids bear flagella
b) *Euglena* when placed in continuous darkness, losses their photosynthetic activity and die
c) The pigments of *Euglena* are quite different from those of green plants

d) *Euglena* is a marine protist

331. Which one of the following pairs is correctly matched?
a) *Rhizobium* – Parasite in the roots of leguminous plants.
b) Mycorrhizae – Mineral uptake from soil
c) Yeast – Production of biogas
d) Myxomycetes – The disease ringworm

332. Transformation experiment was first performed on which bacteria?
a) *E. coli* b) *Diplococcus pneumoniae*
c) *Salmonella typhi* d) *Pasteurella pestis*

333. Fungi are classified on the basis of
a) Sexual reproduction b) Asexual reproduction
c) Vegetative reproduction d) None of these

334. Deuteromycetes is commonly known as imperfect fungi because
a) Only the asexual phase of these fungi is known b) Only the vegetative phase of these fungi is known
c) Only the asexual or vegetative phases of these fungi are known d) Only sexual phase of these fungi are known

335. Read the statements given below. Which of these is wrong?
a) Sporangiospores borne in the sporangium of *Rhizopus* are diploid structures
b) *Rhizopus* belong to the class-Zygomycetes
c) Dominant phase in the life cycle of *Chlamydomonas* is haploid
d) Zoospores of *Chlamydomonas* are haploid

336. Leprosy occurs due to
a) TMV b) *Monocystis* c) *Salmonella* d) *Mycobacterium*

337. Viruses are non-cellular organisms but replicate themselves once they infect the host cell. To which of the following kingdom viruses belong to?
a) Monera b) Protista c) Fungi d) None of these

338. Which of the following phenomenon proves that viruses are living?
a) They carry metabolic activity b) They carry anaerobic respiration
c) They multiply in host cells d) They cause infection

339. I. DJ Ivanowsky (1892) recognised certain microbes as causal organisms of the mosaic disease of tobacco
II. MW Beijerinck (1898) demonstrated that the extract of infected plants of tobacco could cause infection in healthy plants and called the fluid as *contagium vivum fluidum*
III. WM Stanley (1935) showed that these microbes could be crystallised and crystals consist largely of protein
The above statements are assigned to
a) Bacteria b) Virus c) Prions d) Lichens

340. Bacteria that fix CO_2 by using chemical energy as source, are
a) Photoautotrophs b) Photoheterotrophs c) Chemoautotrophs d) Chemoheterotrophs

341. Baker's yeast is
a) *Saccharomyces cerevisiae* b) *Saccharomyces ludwigii*
c) *Saccharomyces octosporus* d) *Schizosaccharomyces*

342. All of the following fungi belongs to Basidiomycetes, except
a) *Agaricus* b) *Ustilago* c) *Puccinia* d) *Alternaria*

343. NH_3 in *Amoeba* is excreted by
a) Food vacuole b) Contractile vacuole c) Plasma membrane d) All of the above

344. An example for symbiotic bacteria
a) *Erwinia amylovora* b) *Rhizobium leguminosarum*
c) *Xanthomonas campestris* d) *Agrobacterium tumefaciens*

345. Which of the following are the common parasite of class-Basidiomycetes?
a) *Ustilago* and *Puccinia* b) *Agaricus* and *Trichoderma*

c) *Alternaria* and *Colletotrichum* d) *Colletotrichum* and *puccinia*

346. In Basidiomycetes, the mycelium is
a) Branched and aseptate b) Branched and septate
c) Unbranched and septate d) Coenocytic

347. Virus multiplies in
a) Soil b) Dead tissue c) Living tissue d) Culture medium

348. As a fungus completes its life cycle on two hosts, it is termed as
a) Heteroecious b) Autoecious c) Heterothallic d) Monothallic

349. Helical contractile sheath occurs in
a) Bacteria b) Bacteriophage c) Retroviruses d) Fungi

350. Which one of the following statements about mycoplasma is wrong?
a) They are also called PPLO b) They are pleomorphic
c) They are sensitive to penicillin d) They cause disease in plants

351. Plasmid is
a) Fungus b) Plastid
c) Part of plasma membrane d) Extrachromosomal DNA in bacterialcell

352. The RNA like particle, which causes disease is
a) Virion b) Viroid c) Prion d) Mycoplasma

353. Members of Protista are primarily
a) Terrestrial b) Aquatic c) Phathogenic d) Photosynthetic

354. Protista includes
a) Unicellular eukaryotes b) Multicellular prokaryotes
c) Unicellular prokaryotes d) All of the above

355. The infective stage of *Plasmodium* to man, is
a) Trophozoite b) Sporozoite c) Merozoite d) None of these

356. Tobacco mosaic virus is
a) Spherical-shaped b) Rod-shaped c) Cuboidal d) Oval-shaped

357. HIV has a protein coat and genetic material
a) ssRNA b) dsRNA c) ssDNA d) dsDNA

358. Which of the following is a nitrogen fixing organism?
a) BGA b) *Rhizobium* c) Both (a)and (b) d) *Agaricus*

359. In mushroom, gills are meant for
a) Respiration b) Nutrition
c) Bears spores which help in reproduction d) Enhancing buoyancy

360. Which one of the following viruses contains both DNA and RNA?
a) Cyanophage b) Herpes virus c) Leuko virus d) Polio virus

361. State whether the given statements are true or false
I. Bacteria shows both autotrophic and heterotrophic nutrition
II. Some of the bacteria are autotrophic. They may be photosynthetic autotrophic or chemosynthetic autotrophic
III. Heterotrophic nutrition involves the obtaining of readymade organic nutrients from outside sources
a) I and II are true b) I is true, II and III is false
c) I, II and III are true d) I, II and III

362. Mycoplasmas are classified under which of the following kingdoms?
a) Animalia b) Protista c) Monera d) Fungi

363. Which of the following is the site f respiration in bacteria?
a) Episome b) Ribosome c) Mesosome d) Microsome

364. In which genera, endospores are formed for reproduction?
a) *Monococcus* and *Clostridium* b) *Bacillus* and *Clostridium*
c) *Mucor* and *Bacillus* d) None of the above

365. Nitrates are converted to nitrogen by
a) Nitrogen fixing bacteria
b) Ammonification bacteria
c) Denitrifying bacteria
d) Nitrifying bacteria

366. In which kingdom, would you classify the archaea and nitrogen-fixing organisms, if the five kingdom system of classification is used
a) Protista b) Monera c) Plantae d) Fungi

367. Which of the following are the indicators of pollution?
a) Lichen b) Fungi c) Algae d) None of these

368. Viruses are also known as
a) Nucleoprotein particle
b) Virion
c) Lipoprotein particles
d) Core

369. Streptomycin is obtained from
a) *Streptomyces griseus*
b) *S. aureofaciens*
c) *S. venezuelae*
d) *S. ramosus*

370. Which of the following is photoautotrophic bacteria?
a) *Nostoc* and *Anabaena* b) *Clostridium* c) *Salmonelia* d) *Escherichia coli*

371. Protists are
I. Unicellular and prokaryote
II. Unicellular and eukaryote
III. Multicellular and eukaryote
IV. Autotroph or heterotroph
a) I, II and III b) II, III and IV c) III and IV d) II and IV

372. Tobacco mosaic virus is a tubular filament of size
a) 300 × 20 nm b) 700 × 30 nm c) 300 × 10 nm d) 300 × 5 nm

373. A teacher was explaining about a constant physical contact involving almost equal physiological interdependence in two different thalloid forms. He was trying to explain
a) Mycorrhizal association
b) Establishment of heterothallism
c) Operation of heterothallism
d) Advent of lichen formation

374. Which of the following bacteria fixes nitrogen without any plant association?
a) *Rhizobium* b) *Nostoc* c) *Anabaena* d) *Azotobacter*

375. Crown gall disease in plants is caused by
a) Ti-plasmid b) Pi-plasmid c) Mycoplasma d) Virus

376. Which of the following does not secrete toxins during storage conditions of crop plants?
a) *Aspergillus* b) *Penicillum* c) *Fusarium* d) *Colletotrichum*

377. Analyse the following statement and identify the correct option given below
I. In diatoms the walls are embedded with silica and thus, the walls are indestructible
II. Diatoms have left behind large amount of cell wall deposits in their habitat, this accumulation over billions of year is referred to as diatomaceous deposition or diatomaceous earth
a) I is true, but II is false
b) I is false, but II is true
c) I and II are true
d) I and II are false

378. In fungi, the fusion of protoplasms between two motile or non-motile gametes is called
a) Plasmogamy b) Plasmokinesis c) Karyogamy d) Cytokinesis

379. Which one of the following helps in absorption of phosphorus from soil by plants?
a) *Rhizohium* b) *Frankia* c) *Anabaena* d) *Glomus*

380. Diatomaceous earth is used for all except
a) Filtration of oils
b) Filtration syrups
c) Polishing
d) Gobar gas production

381. Fungal spores produced extremely at the top of hyphae are

a) Conidia b) Oidia c) Aplanospore d) Sporangiophore

382. Which is a fungal disease?
a) Athlete's foot b) Kala-azar c) Typhus fever d) Chicken pox

383. The free living thalloid body of the slime mould is known a
a) *Protonema* b) *Plasmodium* c) *Fruiting body* d) *Mycelium*

384. Which of the following statement is not true for retroviruses?
a) DNA is not present at any stage in the life cycle of retroviruses
b) Retroviruses carry gene for RNA dependent DNA polymerase
c) The genetic material in mature retroviruses is RNA
d) Retroviruses are causative agents for certain kinds of cancer in man

385. Chrysophytes are
a) Planktons b) Nektons
c) Benthic organisms d) Active organism

386. Among plants 'pheromones' are secreted by the cells of the following plants for given function
a) All plants for growth and development b) Yeast for facilitating mating
c) All fungi for sexual reproduction d) *Rhizopus* for formation of zygospore

387. *Amoeba* differs form *Entamoeba* in having
a) Contractile vacuole b) Pseudopodia c) Ectoplasm d) Cytostome

388. Single-celled eukaryotes are included in
a) Protista b) Fungi c) Archaea d) Monera

389. Plasmids are mostly found in
a) Virus b) Bacteria c) Fungi d) Viroid

390. Consider the following statements about sexual reproduction
I. In class-Phycomycetes, sexual reproduction produces a resting diploid spore called zygospore
II. Zygospores are formed by the fusion of two gametes
III. These gametes are similar in morphology or dissimilar
Which of the statements given above are correct?
a) I and II b) I and III c) II and III d) I, II and III

391. O_2 does not evolved in photosynthesis of
a) BGA b) Green algae c) Bacteria d) Autotrophic plant

392. Fungi that absorbs soluble organic matter from dead substrates are called
a) Saprophytes b) Parasites c) Obligate parasite d) Lichens

393. *Nif* genes occur in
a) *Rhizobium* b) *Aspergillus* c) *Penicillium* d) *Streptococcus*

394. A free living nitrogen fixing cyanobacterium which can also form symbiotic association with the water fern*Azolla* is
a) *Tolypothrix* b) *Chlorella* c) *Nostoc* d) *Anabaena*

395. Which is correct for the structure of cell wall of bacteria and fungi?
a) Both are made up of cellulose b) Both have mucopeptide
c) Both are made up of N-acetylgucosamine d) None of the above

396. Consider the following statements about Deuteromycetes
I. Some members are saprophytes or parasites
II. A large number of members are decomposers of litter and help in mineral cycling
III. *Alternaria, Colletotrichum, Cercospora* and *Trichoderma* are examples of Deuteromycetes
Which of the above are correct?
a) I and II b) I and III c) II and III d) I, II and III

397. Smut and rust belongs to class
a) Basidiomycetes b) Deuteromycetes c) Phycomycetes d) Ascomycetes

398. The advantage of fungus in lichen is
a) Food b) Shelter c) Mineral absorption d) Both (b) and (c)

399. Find out the pairs, which are correctly matched?
I. Cyanobacteria –Biopesticides
II. Mycorrhiza – Solubilization of phosphate
III. *Bacillus thuringiensis* – *cry* protein
IV. Single cell protein – Rhizobia
a) I and II b) II and III c) III and IV d) I and III

400. Which type of DNA is found in bacteria?
a) Helical DNA b) Membrane bound DNA
c) Straight DNA d) Circular free DNA

401. Fungi are divided into four classes on the basis of
a) Morphology of the mycelium b) Mode of spore formation
c) Fruiting bodies d) All of the above

402. Infectious proteins are present in
a) Gemini viruses b) Prions c) Viroids d) Satellite viruses

403. In Phycomycetes, asexual repdocution takes place by
a) Zoospores b) Aplanospores c) Both (a) and (b) d) Conidia

404. *Thermococcus*, *Methanococcus* and *Methanobac – terium* exemplify
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

405. Alexander Fleming in 1929 discovered
a) Penicillin b) Streptomycin c) Tetracyclin d) Chloromycetin

406. Transverse binary fission is found in
a) *Paramecium* b) *Amoeba* c) *Hydra* d) *Euglena*

407. Virus was discovered by whom?
a) Stanley b) Ivanowski c) Herelle d) Beijerinck

408. VAM are
a) Saprophytic bacteria b) Saprophytic fungi c) Symbiotic fungi d) Symbiotic bacteria

409. What are the successive structure formed in course of sexual reproduction of *Rhizopus*?
a) Zygospore, progametangium, gametangium, zygophore
b) Progametangium, zygophore, gametangium, zygospore
c) Progametangium, gametangium, zygospore, zygophore
d) Zygophore, progametangium, gametangium, zygospore

410. Consider the following statement about plants
I. Kingdom-Plantae includes eukaryotic autotrophic, chlorophyll containing organisms
II. It includes algae, bryophytes, pteridophytes, gymnosperms but not angiosperms
III. Plants shows alternation of generation [between haploid gametophytic (n) phase and diploid sporophytic ($2n$) phase]
Which of the statements given above are correct?
a) I and II b) I and III c) II and III d) I, II and III

411. Branched, aseptate, coenocytic mycelium present in
a) *Aspergillus* b) *Albugo* c) *Penicillium* d) *Erysiphe*

412. The structure in *Amoeba* functionally similar to human kidney is
a) Nucleus b) Plasmodesmata c) Plasma membrane d) Contractile vacuole

413. Which one is the most abundant microorganism?
a) Algae b) Viruses c) Protists d) Bacteria

414. The process which cannot take place in the absence of virus is

a) Transformation b) Conjugation c) Translocation d) Transduction

415. Parasexuality was first discovered in
a) Bacteria b) Virus c) Fungi d) None of these

416. Viroids differ from viruses in having
a) Naked RNA molecules only b) Naked DNA molecules only
c) Naked DNA packed with viral genome d) Satellite RNA packed with viral genome

417. Consider the following statements about mycoplasma
I. It is pleuomorphic bacteria, which lacks cell wall
II. Mycoplasma is the smallest living organism
III. They can not survive without oxygen
IV. Many mycoplasma are pathogenic in animals and plants
Which of the statements given above are correct?
a) I, II and III b) II, III and IV c) I, II and IV d) I, II, III and IV

418. Which one of the following does not belong to kingdom-Monera?
a) Mycoplasma b) Achaebacteria c) Slime mould d) Eubacteria

419. Which of the following causes disease in human beings?
a) *Rhizopus* b) *Puccinia* c) *Aspergillus* d) *Cystopus*

420. Pasteurization temperature is
a) 72°C for 20 minutes b) 63°C for 15 seconds c) 67°C for 15 seconds d) 65°C for 30 minutes

421. AIDS in human is caused by
a) Virus b) Bacteria c) Protozoan d) Bacteriophage

422. Cell wall of all fungi are composed of
a) Chitin + polysaccharides b) Cellulose + chitin
c) Pectin + starch d) Silica + lipids

423. Prions are
a) Infectious nucleic acids b) Infectious lipids
c) Infectious proteins d) Infectious nucleoproteins

424. You might find methanogens
a) In a cow's stomach b) In marshy area
c) Both (a) and (b) d) In sulphur spring

425. Which of the following group of diseases is caused by viruses?
a) Mumps, smallpox, herpes, influenza b) AIDS, diabetes, herpes, tuberculosis
c) Anthrax, cholera, tetanus, tuberculosis d) Cholera, tetanus, smallpox, influenza

426. The cyanobacteria are
a) Unicellular b) Colonial c) Filamentous d) All of these

427. Which one of the following is correctly matched?
a) National Institute of Virology – Pune
b) National Institute of Communicable Diseases – Lucknow
c) Central Drug Research Institute – Kasauli
d) National Institute of Nutrition – Mumbai

428. Which of the following groups of organisms are placed under the group chrysophytes?
a) Diatoms only b) Desmids only
c) Diatoms and golden algae d) Desmids and Paramecium

429. The association mycorrhiza is
a) Relationship of algae and fungi b) Relationship of fungi and higher plants
c) Relationship of algae and higher plants d) None of these

430. Who proposed two kingdom system of classification and named kingdoms as Plantae and Animalia?
a) Carolus Linnaeus b) RH Whittaker c) Carl Woese d) Herbert Copeland

431. Consider the following statements about slime moulds
I. *Plasmodium* is found in acellular slime moulds

II. Pseudoplasmodium is found in cellular slime moulds
Which of the statements given above is/are correct?
a) Only I b) Only II c) I and II d) None of these

432. Which of the following options describes the coenocytic condition in fungus?
a) Uninucleate hypha without septum
b) Multinucleate hypha without septum
c) Multicellular hypha
d) Multiciliate hypha

433. Parasexuality is involved with fusion of
a) Gamete and protoplast
b) Male gamete with secondary nucleus
c) Protoplast
d) Male and female gamete

434. Consider the following statements about class-Oomycetes?
I. Member may be obligate parasite on plants
II. The mycelium is aseptate and coenocytic
III. Asexual reproduction involves the formation of spore containing sac or sporangia. In aquatic conditions, the sporangia produces zoospores
Which of the statements given above are correct?
a) I and II b) I and III c) II and III d) I, II and III

435. Which one of the following is a characteristics feature of Chrysophytes?
a) They are parasitic forms which cause diseases in animals
b) They have a protein rich layer called pellicle
c) They have indestructible wall layer deposited with silica
d) They are commonly called dinoflagellates

436. In microbial genetics, which one is referred to as Griffith effect?
a) Conjugation b) Transduction c) Transformation d) Sexduction

437. Potato spindle tuber diseases is caused by a
a) Nematode b) Virus c) Bacterium d) Viroid

438. Viruses are no more 'alive' than isolated chromosomes because
a) They both require oxygen for respiration
b) Both require the environment of a cell to replicate
c) They require both RNA and DNA
d) They both need food molecules

439. Fungi causing hair loss are
a) Keratophilous b) Pyrophilous c) Coprophilous d) None of these

440. The hyphae of *Rhizopus* are
a) Unbranced, aseptate and uninucleate
b) Branched, aseptate and multinucleate
c) Branched, septate and uninucleate
d) Unbranched, septate and coenocytic

441. Deuteromycetes is also known as
a) Sac fungi b) Club fungi c) Imperfect fungi d) Bracket fungi

442. Retroviruses have genetic material
a) DNA only
b) RNA only
c) DNA or RNA only
d) Either DNA or RNA only

443. Bacteriophages kill
a) Fungi b) Parasites c) Bacteria d) Viruses

444. Asexual reproduction in fungi occurs by
a) Ascospores b) Conidia c) Basidiospores d) Oospores

445. Lichens show
a) Mutualism b) Commensalism c) Parasitism d) Saprophytism

446. Ringworm in humans is caused by
a) Bacteria b) Fungi c) Nematodes d) Viruses

447. Which of the following are the examples of insectivorous plant?
a) Bladder wort b) Venus fly trap c) *Nepenthes* d) All of these

448. Which of the following characters served as the criteria for five kingdom system of classification as used by Whittaker?
a) Cell structure b) Body organization and mode of nutrition
c) Reproduction and phylogenetic relationships d) All of the above

449. Some of the cyanobacteria blue green algae can fix atmospheric nitrogen in specialised cells called
a) Akinetes b) Heterocyst c) Endospores d) Homocyst

450. Eubacteria is also known as
a) False bacteria b) True bacteria
c) Archaebacteria d) Heterotrophic bacteria

451. Basidiospores are produced by
a) Yeasts b) Diatoms c) *Agaricus* d) Bacteria

452. Which of the following in the correct sequence of three steps in the sexual cycle of fungi?
a) Mitosis → fusion of two nuclei → meiosis
b) Meiosis → fusion of two nuclei → fusion of protoplasms
c) Fusion of two nuclei → meiosis → fusion of protoplasm
d) Fusion of protoplasm→ fusion of two nuclei → meiosis

453. *Nostoc* and *Anabaena* belongs to
a) Eubacteria b) Archaebacteria c) Cyanobacteria d) Coccibacteria

454. Cyanobacteria is also known as
a) Blue-green algae
b) Heterotrophic bacteria
c) Chemosynthetic autotrophic bacteria
d) Chemosynthetic bacteria

455. Size of TMV is
a) 300 nm long and 18 nm diameter b) 100 nm long and 20 nm diameter
c) 50 nm long and 10 nm diameter d) 500 nm long and 300 nm diameter

456. Specialized cells called heterocysts are present in
a) Dinoflagellates b) Chrysophytes c) Euglenoids d) Cyanobacteria

457. Cellulose is the major component of cell wall of
a) *Pythium* b) *Xanthomonas* c) *Pseudomonas* d) *Saccharomyces*

458. *Claviceps* is a member of
a) Ascomycetes b) Basidiomycetes c) Zygomycetes d) Phycomycetes

459. Mycorrhiza is found in
a) Oligotrophic soil b) Eutrophic soil c) Both (a) and (b) d) None of these

460. Which of the following is a flagellated protozoan?
a) *Amoeba* b) *Entamoeba* c) *Plasmodium* d) *Trypanosoma*

461. Smallest bacteria is
a) *Spirosoma* b) *Hemophilus* c) *Dialister* d) *Desulfovibrio*

462. Slipper animalcule is
a) *Paramecium* b) *Trypanosoma* c) *Entamoeba* d) Protozoa

463. A female *Anopheles* mosquito can be recognized by
a) Proboscis and palpi are long and more or less of equal length
b) Proboscis long and palpi short
c) Proboscis short and palpi long
d) Both proboscis and palpi are short

464. Highest number of antibiotics are produced by
a) *Bacillus* b) *Penicillium* c) *Streptomyces* d) *Cephalosporum*

465. Who proposed five kingdom classification and named kingdoms as Monera, Protista, Fungi, Plantae and Animalia?
a) Herbert Copeland b) R H Whittaker c) Carl Woese d) Carolus Linnaeus

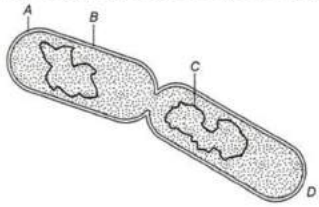
466. Which one the following is a red dinoflagellate?
a) *Euglena* b) Diatoms c) *Gonyaulax* d) *Plasmodium*

467. Phytotoxins are secreted by plants in response to fungal reaction. These compounds are generally
a) Proteins b) Glycoproteins c) Phenolic compounds d) Lipids

468. In many bacteria, the cell membrane becomes invaginated and folded to form
a) Pili b) Cristae c) Fimbriae d) Mesosomes

469. *Paramecium*
I. is a ciliated protozoan
II. has a cavity that opens to the outside the cell surface
III. shows water current maintained by cilia which helps the food to be steared into gullet
Which of the statement given above are correct?
a) I and II b) I and III c) II and III d) I, II and III

470. Identify the label *A*, *B*, *C* and *D* in the following figures



a) A-Plasma membrane, B-Cell wall, C-RNA, D-Spore formation
b) A-Cell wall, B-Cell membrane, C-DNA, D-Binary fission
c) A-Mucilaginous, B-Cell membrane, C-RNA, D-Conjugation
d) A-Plasma membrane, B-Mucilaginous, C-DNA, D-Transformation

471. Select the false statement
a) Scientists who study and contribute to the classification of organisms are known as systematic
b) Carolus Linnaeus developed the first scientific system of naming species
c) A five kingdom arrangement of organisms was introduced by R H Whittaker
d) Phycomycetes are called club fungi because of a club-shaped end of mycelium known as basidium

472. The respiratory process of yeast is
a) Rarely anaerobic b) Anaerobic c) Purely aerobic d) Both (a) and (b)

473. Viruses that infect bacteria, multiply and cause their lysis are
a) Lysozymes b) Lipolytic c) Lytic d) Lysogenic

474. The fungus used for the commercial production of SCP is
a) *Pentadiplandra brazzeana* b) *Fusarium graminearum*
c) *Brassica napus* d) *Bacillus thuringiensis*

475. In *Vorticella*, the total number of micronuclei formed at the end of pre-zygotic nuclear division in female gamete is
a) 4 b) 6 c) 8 d) 5

476. Consider the following statement about kingdom-Animalia
I. They are heterotrophic, eukaryotic, multicellular organisms
II. Cells do not have cell walls
III. Mode of nutrition is holozoic
Which of the statements given above are correct?
a) I and II b) I and III c) II and III d) I, II and III

477. Consider the following statements
I. Kingdom-Protista forms a link between monerans and the other organisms like plants, animal and fungi
II. Protists reproduce asexually and sexually by a process involving cell fusion and zygote formation

III. Being eukaryotes, the protistan cell body contains a well defined nucleus and other membrane-bound organelles

Which of the statements given above are correct?

a) I and II b) I and III c) II and III d) I, II and III

478. Cyanobacteriun is an

a) Alga having blue-green pigment b) Alga having red pigment

c) Alga having brown pigment d) Alga having yellow-brown pigment

479. Which will you look for the sporozoites of the malarial parasite?

a) Red blood corpuscles of human suffering from malaria

b) Spleen of infected humans

c) Salivary glands of freshly moulted female *Anopheles* mosquito

d) Saliva of infected female *Anopheles*

480. During unfavorable conditions, *Amoeba* reproduces through

a) Binary fission b) Sporulation c) Multiple fission d) Conjugation

481. The 'witches broom' is caused by a

a) Virus b) Mycoplasma c) Bacterium d) Fungus

482. Deuteromycetes reproduces only by asexual spores known as

a) Conidia b) Endospores c) Zoospores d) Heterocyst

483. Lichens are composite organisms consisting of a fungus and a photosynthetic partner (algae), growing together in a symbiotic relationship

Consider the following statements about lichens

I. Lichen are very good air pollution indicators

II. Algal partner and fungal partner live mutually

III. Algae prepares food for fungi

IV. Fungi provides shelter and absorbs water and minerals for algal partner

Which of the statements given above are correct?

a) I, II and III b) II, III and IV c) I, II and IV d) I, II, III and IV

484. Mycorrhiza is an example of

a) Symbiosis b) Parasitism c) Saprophytism d) None of these

485. Murein is not found in the cell wall of

a) *Nostoc* b) Eubacteria c) Cyanobacteria d) Diatoms

486. Which one of the following forms of the bloom is present in polluted water?

a) Blue-green algae b) Red algae c) Blue algae d) Brown algae

487. Which of the following is a parasitic fungi of mustard?

a) *Rhizopus* b) *Albugo* c) *Agaricus* d) *Neuropora*

488. Which of the following protist release toxins that may even kill fishes and other marine animal?

a) *Euglena* b) *Gonyaulax* c) *Paramecium* d) *Plasmodium*

489. *Triatoma infestans* is the intermediate host in the life cycle of

a) *Leishmania donovani* b) *Trypanosoma cruzi*

c) *Leishmania tropica* d) *Schistosoma haematobium*

490. Members of Phycomycetes are found

I. In aquatic habitats

II. on decaying wood

III. in moist and damp places

IV. as obligate parasite on plants

Which of the statements given above are correct?

a) I and II b) I, II and III c) II, III and IV d) I, II, III and IV

491. Outer covering of virus made up of protein is

a) Capsid b) Coat c) Virion d) Viriod

492. *Plasmodium* is an

a) Endoparasite b) Ectoparasite c) Intercellular parasite d) Both (a) and (b)

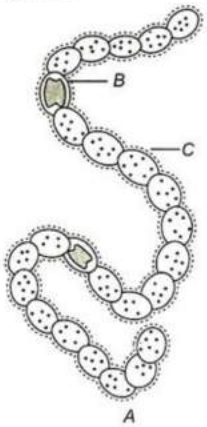
493. In which year, Ronald Ross found malaria parasite infection in mosquito?
a) 1897 b) 1850 c) 1835 d) 1859

494. *Mucor* and *Rhizopus* are included in class
a) Ascomycetes b) Phycomycetes c) Basidiomycetes d) Deuteromycetes

495. On the basis of their shape, bacteria are grouped under...categories
a) Three b) Four c) Five d) Six

496. Plasmogamy is the fusion of
a) Two haploid cells including their nuclei
b) Two haploid cells without nuclear fission
c) Sperm and egg
d) Sperm with two polar nuclei

497. Given figure is of a filamentous blue-green algae. Identify the algae name *A*, *B* and *C* in the following figures



a) A-*Gelidium*, B-Vegetative cell, C-Heterocyst
b) A-*Volvox*, B-Somatic cell, C-Mucilaginous sheath
c) A-*Chara*, B-Mucilaginuous sheath, C-Heterocyst
d) A-*Nostoc*, B-Heterocyst, C-Mucilaginous sheath

498. Diatoms and desmids are found in
a) Freshwater b) Marine environments
c) Both (a) and (b) d) Terrestrial environments

499. In *Plasmodium*, ookinete is formed by
a) Trophozoite b) Zygote c) Sporozoite d) Merozoite

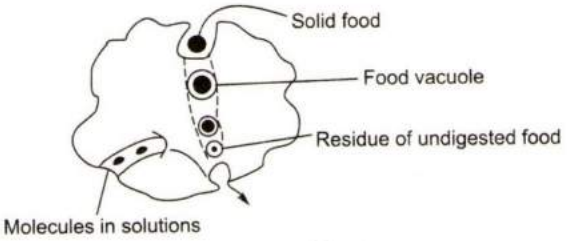
500. Late blight of potato is caused by
a) *Cystopus* b) *Phytophthora* c) *Alternaria* d) *Ustilago*

501. *Paramecium* is an aquatic and actively moving organism due to the presence of
a) Pseudopodia b) False feet c) Thousands of cilia d) Flagella

502. Phage genome site on bacterial chromosome resulted in the structure
a) Nucleic acid b) Heterocyst c) Prophage d) None of these

503. Enveloped virus enters into host cells by
a) Injecting own nucleic acid inside host cells b) By contact with cell receptor and endocytosis
c) By phagocytosis d) Fusion with the plasma membrane of host

504. In the diagram, which of the following process is/are shown in *Amoeba*?



a) Exocytosis b) Phagocytosis c) Pinocytosis d) All of these

505. What is haemozoin?
a) Undigested part of blood in trophozoite of *Plasmodium*.
b) Blood pigment of *Anopheles*
c) Decomposed blood in merozoites.
d) Granules in the blood of infected person.

506. *Euglena* is found in
a) Fresh and running water
b) Fresh and stagnant water
c) Marine water
d) Both (a) and (c)

507. Five kingdom classification was given by
a) Huxley b) Hooker c) Whittaker d) Linnaeus

508. The bacteria *Pseudomonas* is useful because of its ability to
a) Transfer genes from one plant to another
b) Decompose variety of organic compounds
c) Fix atmospheric nitrogen in the soil
d) Produced a wide variety of antibiotics

509. In fungi, the fusion of two nuclei is called
a) Plasmogamy b) Karyogamy c) Plasmokinesis d) Cytokinesis

510. Euglenoid species that have chlorophyll are
a) Facultative autotrophs
b) Facultative heterotrophs
c) Obligate heterotrophs
d) Obligate autotrophs

511. Where the members of Basidiomycetes are grown
a) In soil
b) On logs
c) On tree stumps and in living plant bodies
d) All of the above

512. Plasmids occur in
a) Viruses b) Chromosomes c) Bacteria d) Chloroplasts

513. The fruiting body formed from a filamentous heterotrophic organism, which is known for its nutritive value for the humanity, is
a) Cremocarp b) Acervulus c) Basidiocarp d) Akinete

514. Phycomycetes is a class in kingdom
a) Protista b) Fungi c) Plantae d) Animalia

515. Viral genome, incorporated and integrated with bacterial genome is referred to as
a) Prophages b) RNA c) DNA d) Both (a) and (c)

516. The slime moulds are characterized by the presence of
a) Elaters b) Pseudoelaters c) Capillitium d) Capitulum

517. Spirochaetes is/are
a) A class of insects b) A class of viruses c) Bacteria d) Fungi

518. Which one is correctly matched?
a) Oncogenes – ageing
b) Replication fork –*m*RNA
c) AIDS virus – reverse transcriptase
d) Initiation factors – amino acid activation

519. Myxomycetes are
a) Saprobes or parasites having mycelia, asexual reproduction by fragmentation and sexual reproduction by fusion of gametes
b) Slimy mass of multinucleate protoplasm, having pseudopodia like structures for engulfing food, reproduction through fragmentation or zoospores
c) Prokaryotic organisms, cellular or acellular, saprobes or autotrophic, reproduce by binary fission

d) Eukaryotic, single-celled or filamentous, saprobes or autotrophic, asexual reproduction by division of haploid individuals, sexual reproduction by fusion of two cells or their nuclei

520. Sol-gel theory, for the first time, was given by
a) Pantin b) Hyman c) Best d) Mast

521. In AIDS, HIV kills
a) Antibody molecule b) T-helper cell c) Bone marrow cells d) T-cytotoxic cell

522. Gene regulation in bacteria is shown by
a) Jacob and Monod b) Beadle and Tatum c) Temin and Baltimore d) Kornberg

523. Consider the following statements
I. Bacteria reproduce only by binary fission
II. Under unfavourable conditions, bacteria produce several types of spores
III. Bacteria reproduce by a sort of sexual reproduction by adopting a primitive type of RNA transfer from one bacterium to other
Which of the statements given below are correct?
a) I and II b) I and III c) II and III d) All of these

524. *Amoeba* is a/an
a) Unicellular animal b) Octacellular animal
c) Multicellular animal d) All of these

525. Amoeboid protozoans
I. live in freshwater, sea water or moist soil
II. has pseudopodia for locomotion and capturing prey
III. have silica shells on their surface in marine forms
Which of the statements given above are correct?
a) I and II b) I and III c) II and III d) I, II and III

526. Colourless, unicellular, cell wall bound spherical or rod-shaped microorganism and lacking organized nucleus is called
a) Mycoplasma b) Virus c) Bacteria d) Cyanobacteria

527. Which stain shows Gram negative bacteria during bacterial staining?
a) White b) Red c) Black d) Purple

528. Encysted, non-motile and non-feeding infectious stage of *Entamoeba histolytica* is called
a) Schizont b) Zygote c) Minuta form d) Abiotic form

529. TO Diener (1971) discovered a new infections agent that was smaller than viruses
Consider the following statements about this infectious agent
I. It cause pototo spindle tuber disease
II. These are infectious RNA particles
III. It lacks the protein coat
IV. The molecular wt of its RNA is low
The above statements are assigned to
a) Viruses b) Viroids c) Prions d) Lichen

530. Consider the following statements about Ascomycetes
I. They are saprophytic, decomposer, coprophilous and parasitic
II. Includes unicellular and multicellular forms
III. Mycelium is coenocytic and aseptate
IV. *Aspergillus*, *Claviceps*, *Neurospora* are important examples of Ascomycetes
Which of the statements given above is/are false?
a) Only I b) Only II c) Only III d) I and III

531. What happens in anterior part of *Amoeba* at the time of formation of pseudopodia?
a) Plasma gel is converted into plasma sol.
b) Plasma sol is converted into plasma gel.
c) Ectoplasm is converted into endoplasm.

d) Endoplasm is converted into ectoplasm.

532. Fungi shows vegetative reproduction by all of the following except
a) Fragmentation b) Fission c) Budding d) Akinetes

533. Most abundant bacteria are
a) Chemosynthetic bacteria b) Heterotrophic bacteria
c) Heterotrophic decomposers d) Archaebacteria

534. The replacement of two kingdom grouping by five kingdom classification was proposed in the year
a) 1859 b) 1758 c) 1862 d) 1969

535. Which part of an animal virus is not reproduced in multiple copies?
a) Capsid b) Proteins c) Envelope d) Ribosomes

536. How many young amoebae hatch out from a cyst of *E. histolytica*?
a) One b) Two c) Four d) Six

537. Difference between virus and viroid is
a) Absence of protein coat in viroid and its presence in viruses
b) Presence of low molecular weight RNA in virus but absent in viroid
c) Both (a) and (b)
d) None of the above

538. The thalloid body of a slime mould (Myxomycetes) is known as
a) Protonema b) Plasmodium c) Fruiting body d) Mycelium

539. Powdery mildews of crops are caused by
a) Basidiomycetes b) Phycomycetes c) Ascomycetes d) Eucomycetes

540. Galic acid used in making ink is obtained with the help of
a) *Aspergillus niger* b) *Penicillium purpurogenum*
c) *Streptococcus lactis* d) *Lactobacillus bulgarius*

541. Enzymes are absent in
a) Algae b) Plants c) Virus d) Bacteria

542. Virion is a
a) Bacterium b) Blue-green algae c) Simple virus particle d) None of these

543. Which of the following is an edible 'fungi'?
a) *Mucor* b) *Penicillium* c) *Agaricus* d) *Rhizopus*

544. Halophilic archaebacterium, *eg*, *Halobacterium salinarum* found in great salt lake and dead sea cannot live in
a) Less than 3M NaCl concentration b) Less than 5M NaCl concentration
c) More than 4M NaCl concentration d) More than 3M NaCl concentration

545. Cosmid is
a) Extragenetic material in mycoplasma
b) Circular DNA in bacteria
c) Extra DNA in bacteria
d) Fragment of DNA inserted in bacteria for forming copies

546. Name the fungus that is edible.
a) *Penicillium* b) *Mucor* c) *Rhizopus* d) *Morchella*

547. T O Diener discovered a
a) Free infectious RNA b) Free infectious DNA c) Infectious protein d) Bacteriophage

548. All eubacteria have
a) Rigid cell wall b) Flagellum c) Silica d) Both (a) and (b)

549. Which of the following plant virus has DNA in it?
a) Tobacco mosaic virus b) Potato mosaic virus
c) Tomato mosaic virus d) Cauliflower mosaic virus

550. Regarding plants, choose the correct statement

a) All are eukaryotes chlorophyll containing organism
b) All are unicellular prokaryotes chlorophyll containing organism
c) All are multicellular eukaryotes that are photosynthetic heterotrophs
d) All are unicellular prokaryotes that are photosynthetic heterotrophs

551. During conjugation in *Paramecium*
a) Out of the four micronuclei formed, three degenerate
b) Out of six macronuclei formed, four degenerate
c) Zygote nucleus undergoes eight successive division in each conjugant
d) Out of 16 nuclei, only 4 degenerate

552. Identify the edible and delicate Ascomycetes members
a) *Agaricus* and *Puccinia*
b) Morels and truffles
c) Puffball and *Agaricus*
d) Puffball and mushrooms

553. Clamp connections are found in
a) Phycomycetes b) Ascomycetes c) Basidiomycetes d) Deuteromycetes

554. Carries of *Entamoeba histolytica* are
a) Mosquito of genus-*Anopheles*
b) Cattle
c) *Musca domestica* (housefly)
d) Healthy human host

555. Nutrition of *Entamoeba* is
a) Sporophytic b) Autotrophic c) Chemotrophic d) Parasitic

556. Chlorophyll-α absent, in which of the following photosynthetic organisms?
a) Cyanobacteria b) Red algae c) Brown algae d) Bacteria

557. Name the class of the Mycota which is commonly called 'fungi imperfecti'?
a) Deuteromycota b) Ascomycota c) Zygomycota d) Basidiomycota

558. Yeast and *Penicillium* are the example of class
a) Phycomycetes b) Ascomycetes c) Deuteromycetes d) Basidiomycetes

559. A plasmid
a) Cannot replicate
b) Can replicate independently
c) Shows independent assortment
d) Lies together with chromosomes

560. ..... include blue-green algae, which have chlorophyll-a similar to green plants.
Complete the given sentence with an appropriate option
a) Chemosynthetic autotrophic bacteria
b) Photosynthetic autotrophic bacteria
c) Protista
d) Saprophytic

561. When a freshwater protozoan, possessing a contractile vacuole, is placed in a glass containing marine water, the vacuole will?
a) Increase in number b) Disappear c) Increase in size d) Decrease in size

562. A kingdom common to unicellular animals and plants is
a) Monera b) Plantae c) Fungi d) Protista

563. The given statements describes a group of organisms
I. The pellicle is composed of fibrous elastic protein lipid or carbohydrates and maintains a definite shape
II. They have two flagella, short and a long one. Each flagellum arises from a basal granule
III. They are connecting link between plants and animals
Which of the following group is referred here?
a) Euglenoids b) Diatoms c) Slime moulds d) Protozoans

564. Plant like nutrition is present in
a) *Amoeba* b) *Paramecium* c) *Euglena* d) *Plasmodium*

565. Which of the following statement is false?
a) TMV has a double-stranded RNA molecule
b) Most plant viruses are RNA viruses
c) The bacteriophage has a double-stranded DNA molecule
d) Most animal viruses are DNA viruses

566. The main difference between Gram positive and Gram negative bacteria is
a) Cell membrane b) Cell wall c) Ribosome d) Mitochondria

567. Plant virus contains
a) DNA b) RNA c) Both (a) and (b) d) Plasmids

568. A new infectious agent that is smaller than virus is
a) Prions b) Viroids c) bacteria d) Mycoplasma

569. The agents which are known to cause CJD are
a) Protein particles b) A class of bacteria c) A class of viruses d) Fungi

570. Eubacteria includes
a) Blue-green algae
b) Archaebacteria and blue-green algae
c) Cyanobacteria and prokaryotes
d) Bacteria and eukaryotes

571. Kingdom-Animalia organisms
I. are capable of locomotion
II. have specialised sensory and neuromotor system
III. shows sexual mode of reproduction
IV. show the sexual reproduction by copulation of male and female followed by embryological development
Which of the statements given above are correct
a) I and II b) I and III c) II, III and IV d) I, II, III and IV

572. Which of the following is not characteristic of Gram positive bacteria?
a) Cell wall is smooth
b) Mesosomes are distinctive prominent
c) Basal body of flagellum contains two rings
d) Murein content of cell wall is 70-80%

573. Which of the following provided to plant by fungi present in mycorrhiza?
a) Phosphate b) Nitrate c) Carbonate d) Chloride

574. Multinucleated filament of *Rhizopus* is
a) Coenocytic b) Conidia c) Heterothallus d) Homothallus

575. Yeast belongs to
a) Zygomycetes b) Basidiomycetes c) Ascomycetes d) Phycomycetes

576. Choose the correct sequence of stages of growth curve for bacteria
a) Lag, log, stationary, decline phase
b) Lag, log, stationary phase
c) Stationary, lag, log, decline phase
d) Decline, lag, log phase

577. Dinoflagellates have
a) Two flagella which lies longitudinally
b) Only one flagellum in the transverse groove between the cell plates
c) Only one flagellum in the longitudinal groove between the cell plates
d) One flagella lies longitudinally and the other transversely in a furrow between the wall plates

578. The sub-unit of capsid is called
a) Capsomere b) Core c) Nucleoside d) Nucleotide

579. Which one of the following is not commercially produced by yeast?
a) Enzyme b) Vitamin c) Hormone d) Riboflavin

580. Industrial production of ethanol from starch is brought about by certain species of
a) *Azotobacter* b) *Lactobacillus* c) *Saccharomyces* d) *Penicillium*

581. Which of the following groups of organisms are ecological similar?
a) Producer protists and consumer protists
b) Monerans and producer protists
c) Consumer protists and fungi
d) Monerans and fungi

582. The autonomously independent self-replicating extra nuclear DNA imparting certain factors to some bacterium is called
a) Plastid b) Plasmid c) Phagemid d) Cosmid

583. The bacterium (*Clostridium botulinum*) that causes botulism is
a) A facultative anaerobe
b) An obligate anaerobe

c) A facultative aerobe
d) An obligate aerobe

584. The kingdom of prokaryotes is
a) Protista
b) Monera
c) Fungi
d) Plantae

585. Heterocysts present in *Nostoc* are specialised for
a) Photosynthesis
b) Food storge
c) Nitrogen fixation
d) Fragmentation

586. A peculiar odour that prevails in marshy areas and cow-sheds is on account of a gas produced by
a) Mycoplasma
b) Archaebacteria
c) Slime moulds
d) Cyanobacteria

587. 'Foolish seedling disease' of rice in Japan was caused by
a) The deficiency of nitrogen
b) A bacterium
c) A fungus
d) A virus

588. HIV virus affect .... In AIDS patient.
a) Cytotoxic T-cell
b) M-N cell
c) Suppressor cell
d) Helper T-Cells

589. Which of the following diseases are caused by bacteria?
I. Flu
II. Cholera
III. Typhoid
IV. Tetanus
Codes
a) I, II and III
b) II, III and IV
c) I, III and IV
d) I, II, III and IV

590. Botanical name of species, which causes white rust of crucifers?
a) *Peronospora parasitica*
b) *Puccinia graminis*
c) *Pythium debarganum*
d) *Albugo candida*

591. Fungi that absorbs nutrients directly from the living host cytoplasm are called
a) Saprophytes
b) Parasites
c) Symbionts
d) Mycorrhiza

592. Which of the following is a slime mould?
a) *Rhizopus*
b) *Physarum*
c) *Thiobacillus*
d) *Anabaena*

593. Analyse the following statements and identify the correct option given below.
I. Viruses that infects plants have single-stranded RNA and viruses that infects animals have either single or double-stranded RNA or double stranded DNA
II. Bacterial viruses or bacteriophase are usually single-stranded RNA viruses
Codes
a) I is true, but II is false
b) I is false, but II is true
c) I and II are true
d) I and II are false

594. Lichen is the pioneer vegetation on which succession?
a) Hydrosere
b) Lithosere
c) Psammosere
d) Xerosere

595. Which of the following conditions would be favoured by thermoacidophiles?
a) Hot and alkaline
b) Snow and acidic
c) Hot and sulphur spring
d) Gut of cows

BIOLOGICAL CLASSIFICATION

: ANSWER KEY :

1)	a	2)	b	3)	a	4)	a	165)	c	166)	b	167)	b	168)	a
5)	c	6)	b	7)	a	8)	b	169)	b	170)	c	171)	a	172)	b
9)	d	10)	a	11)	a	12)	a	173)	b	174)	d	175)	a	176)	a
13)	c	14)	a	15)	a	16)	b	177)	b	178)	d	179)	a	180)	b
17)	b	18)	c	19)	b	20)	d	181)	a	182)	b	183)	a	184)	d
21)	b	22)	b	23)	a	24)	c	185)	c	186)	c	187)	a	188)	d
25)	d	26)	c	27)	d	28)	d	189)	d	190)	d	191)	b	192)	a
29)	c	30)	d	31)	a	32)	a	193)	a	194)	d	195)	d	196)	b
33)	c	34)	d	35)	a	36)	a	197)	a	198)	c	199)	b	200)	a
37)	c	38)	b	39)	d	40)	c	201)	a	202)	a	203)	a	204)	b
41)	d	42)	a	43)	a	44)	b	205)	d	206)	c	207)	b	208)	d
45)	c	46)	b	47)	a	48)	b	209)	a	210)	a	211)	d	212)	a
49)	a	50)	a	51)	b	52)	a	213)	b	214)	b	215)	b	216)	d
53)	a	54)	b	55)	b	56)	a	217)	c	218)	c	219)	b	220)	a
57)	c	58)	c	59)	d	60)	a	221)	a	222)	d	223)	a	224)	d
61)	c	62)	c	63)	b	64)	d	225)	c	226)	a	227)	d	228)	d
65)	d	66)	a	67)	d	68)	c	229)	d	230)	a	231)	d	232)	b
69)	d	70)	a	71)	c	72)	c	233)	a	234)	a	235)	b	236)	b
73)	a	74)	b	75)	a	76)	b	237)	b	238)	a	239)	b	240)	b
77)	d	78)	c	79)	a	80)	d	241)	a	242)	c	243)	b	244)	c
81)	a	82)	a	83)	c	84)	c	245)	c	246)	c	247)	d	248)	d
85)	c	86)	b	87)	c	88)	a	249)	a	250)	b	251)	d	252)	c
89)	b	90)	c	91)	c	92)	b	253)	c	254)	a	255)	c	256)	c
93)	a	94)	b	95)	a	96)	b	257)	a	258)	b	259)	d	260)	a
97)	d	98)	d	99)	d	100)	c	261)	d	262)	a	263)	a	264)	a
101)	d	102)	c	103)	b	104)	c	265)	d	266)	c	267)	a	268)	a
105)	d	106)	d	107)	a	108)	d	269)	b	270)	a	271)	a	272)	b
109)	a	110)	b	111)	a	112)	b	273)	a	274)	a	275)	a	276)	d
113)	c	114)	b	115)	a	116)	c	277)	b	278)	b	279)	a	280)	b
117)	c	118)	d	119)	c	120)	a	281)	d	282)	a	283)	c	284)	a
121)	b	122)	b	123)	a	124)	c	285)	a	286)	a	287)	b	288)	d
125)	c	126)	a	127)	c	128)	b	289)	b	290)	b	291)	d	292)	c
129)	c	130)	a	131)	a	132)	d	293)	a	294)	c	295)	c	296)	a
133)	b	134)	b	135)	a	136)	a	297)	d	298)	c	299)	d	300)	a
137)	a	138)	b	139)	a	140)	a	301)	b	302)	b	303)	c	304)	b
141)	a	142)	b	143)	b	144)	b	305)	c	306)	a	307)	a	308)	b
145)	a	146)	c	147)	a	148)	c	309)	a	310)	b	311)	d	312)	a
149)	d	150)	b	151)	c	152)	b	313)	d	314)	c	315)	b	316)	b
153)	d	154)	b	155)	a	156)	d	317)	a	318)	a	319)	b	320)	c
157)	c	158)	a	159)	c	160)	c	321)	a	322)	b	323)	b	324)	a
161)	c	162)	a	163)	a	164)	a	325)	c	326)	d	327)	d	328)	d

329)	c	330)	a	331)	b	332)	b	465)	b	466)	c	467)	c	468)	d
333)	a	334)	c	335)	a	336)	d	469)	d	470)	c	471)	d	472)	d
337)	d	338)	c	339)	b	340)	c	473)	c	474)	b	475)	a	476)	d
341)	a	342)	d	343)	b	344)	b	477)	d	478)	a	479)	d	480)	c
345)	a	346)	b	347)	c	348)	a	481)	d	482)	a	483)	d	484)	a
349)	b	350)	c	351)	d	352)	b	485)	d	486)	a	487)	b	488)	b
353)	b	354)	a	355)	b	356)	b	489)	b	490)	a	491)	a	492)	a
357)	a	358)	b	359)	c	360)	c	493)	a	494)	b	495)	b	496)	b
361)	c	362)	c	363)	c	364)	b	497)	d	498)	c	499)	b	500)	b
365)	c	366)	b	367)	a	368)	a	501)	c	502)	c	503)	d	504)	d
369)	a	370)	a	371)	d	372)	a	505)	a	506)	b	507)	c	508)	b
373)	d	374)	d	375)	a	376)	d	509)	b	510)	a	511)	d	512)	c
377)	c	378)	a	379)	d	380)	d	513)	c	514)	b	515)	a	516)	c
381)	a	382)	a	383)	a	384)	a	517)	c	518)	c	519)	b	520)	b
385)	a	386)	b	387)	a	388)	a	521)	b	522)	a	523)	c	524)	a
389)	b	390)	d	391)	c	392)	a	525)	d	526)	c	527)	b	528)	c
393)	a	394)	d	395)	c	396)	d	529)	b	530)	c	531)	b	532)	d
397)	a	398)	d	399)	b	400)	d	533)	c	534)	d	535)	d	536)	a
401)	d	402)	a	403)	c	404)	a	537)	c	538)	b	539)	c	540)	a
405)	a	406)	a	407)	b	408)	c	541)	c	542)	c	543)	c	544)	a
409)	d	410)	b	411)	b	412)	d	545)	d	546)	d	547)	a	548)	d
413)	d	414)	d	415)	c	416)	a	549)	d	550)	a	551)	a	552)	a
417)	c	418)	c	419)	c	420)	d	553)	c	554)	c	555)	d	556)	d
421)	a	422)	a	423)	c	424)	c	557)	a	558)	b	559)	b	560)	b
425)	a	426)	d	427)	a	428)	c	561)	b	562)	d	563)	a	564)	c
429)	b	430)	a	431)	c	432)	b	565)	a	566)	b	567)	b	568)	b
433)	c	434)	d	435)	c	436)	c	569)	a	570)	a	571)	d	572)	d
437)	d	438)	b	439)	a	440)	b	573)	a	574)	a	575)	c	576)	a
441)	c	442)	b	443)	c	444)	b	577)	d	578)	a	579)	c	580)	c
445)	a	446)	b	447)	d	448)	d	581)	d	582)	b	583)	b	584)	b
449)	b	450)	a	451)	c	452)	d	585)	c	586)	b	587)	c	588)	d
453)	c	454)	a	455)	a	456)	d	589)	b	590)	d	591)	b	592)	b
457)	a	458)	a	459)	a	460)	d	593)	a	594)	b	595)	c		
461)	c	462)	a	463)	a	464)	c								

: HINTS AND SOLUTIONS :

1 **(a)**
Osmoregulation in *Paramecium* is a function of contractile vacuole. *Paramecium*contains two contractile vacuoles, which have fixed positions near the body ends in ectoplasm of aboral side. Each vacuole contains a definite unit membrane covering called vacuolar condensation membrane.

2 **(b)**
Fungi imperfecti includes *Alternaria, Tricoderma* and *Colletotrichum*

3 **(a)**
Yeast are unicellular, degenerated, non-mycelial, saprophytic fungi possessing no hyphae. But sometimes, chain of buds is formed during rapid growth, which may give false appearance of a mycelium and called as pseudomycelium

4 **(a)**
The bacillariophycean members (diatoms) are microscopic, eukaryotic, unicellular or colonial coccoid algae. These algae are sexually reproduced by the formation of auxospores in most cases. Homocysts are formed by few cyanobacteria.

5 **(c)**
HIV (Human Immunodeficiency Virus) is a retrovirus. The name retrovirus comes from the fact that it has two single strands of genomic RNA and enzymereverse transcriptase which converts virus RNA into a single strand of DNA.

6 **(b)**
Commonly known forms of class-Basidiomycetes are mushroom, bracket fungi or puffballs. The mycelium is branched and septate.
The asexual spores are generally not found, but vegetative reproduction by fragmentation is common. Sex organs are absent, but plasmogamy is brought about by the fusion of two vegetative or somatic cell of different strains or genotypes. The resultant structure is dikaryotic, which ultimately gives rise to basidium. Karyogamy and meiosis take pleace in the basidium producing four basidiospores. The basidiospores are exogenously produced on the basidium. The basidia are arranged in fruiting bodies called basidiocarps

7 **(a)**
Tree, shrubs and herbs.
Aristotle was the earliest to attempt a more scientific basis for classification. He used simple morphological characters to classify plants into trees, shrubs and herbs. He also divided animals into two groups, those which had red blood and those that did not

8 **(b)**
Citrus canker is a disease affecting citrus species that is caused by the bacterium *Xanthomonas axonopodis*

9 **(d)**
Some viral families (Picornaviridae, Togaviridae, Rhabdoviridae, Reoviridae, Retroviridae, etc) contain RNA (either single or double stranded) as their genetic material.

10 **(a)**
The genus *Trypanosoma* is parasitic in the blood of most of the vertebrates.
*Trypanosoma gambiense*causes African sleeping sickness.

11 **(a)**
Bacteria are simple in structure but complex in behaviour

12 **(a)**
The Gram stain is named after the developer **Christian Gram**. About 75% of known bacteria are Gram negative *e. g.*, *Salmonella*, *Pseudomonas*, *Vibrio*, *Helicobacter*,

13 **(c)**
Structurally, viruses are very diverse, varying widely in size, shape and chemical composition. The nucleic acid of the virus is always located within the virion particle and is surrounded by a protein shell called the capsid. The complete complex of nucleic acid and protein, packaged in the virion is called the virus nucleocapsid.

14 **(a)**
The **fungi** are achlorophyllous, heterotrophic organisms, which cannot prepare their own food. They live as either parasites or saprophytes.

However, some forms live symbiotically with other green forms. So, parasitic and saprophytic conditions are more familiar in fungi.

15 **(a)**
Bacteriophage is the virus which causes infection of bacteria. It releases lysozyme during penetration phase.

16 **(b)**
*Cladonia rangiferina*is reindeer moss. It is a furticose lichen. It is used as food for reindeer, musk, ox and other wild animals of the Arctic Tundra zone.

17 **(b)**
Bacteria are prokaryotes. In five kingdom system of classification of **R H Whittaker**, all prokaryotes are included in kingdom-Monera.

18 **(c)**
The genus-*Azotobacter* comprises large, free-living, Gram negative, obligately aerobic, rod-shaped bacteria which are capable of fixation of nitrogen non-symbiotically.
*Rhizobium*is a symbiotic nitrogen fixing bacteria, *Nitrosomanas* is a nitrifying bacteria, while *Pseudomonas* sp. is denitrifying bacteria.

19 **(b)**
In rhabdoviruses (rabies, virus, wheat mosaic virus), para myxoviruses (mumps virus, sendai virus), picornaviruses (polio virus), orthomyxovirus (influenza virus), the genetic material is single stranded RNA (ssRNA).

20 **(d)**
Agaricus belongs to class-Basidiomycetes. *Agaricus* is a genus of mushrooms containing both edible and poisonous species

21 **(b)**
Photosynthetic bacteria contain bacterial chlorophyll as a light trapping pigment molecule that absorbs light between 800 to 925 nm, depending on the species of bacteria.

22 **(b)**
Slime moulds are saprophytic protists. In slime moulds, spores possess true walls. The spores are dispersed by air. They are extremely resistant and survive for many years even under adverse conditions

23 **(a)**
Penicillin was discovered by **Alexander Fleming** from *Penicillium natatum* fungus. *Penicillium* is called green mould, which belongs to class-Ascomycetes. Today, penicillin is also obtained from *Penicillium crysogenum*.

24 **(c)**
Thermococcus, Methanococcus and *Methanobacterium* are archaebacteria with negatively supercolled DNA as in eukaryotes but lacking histones

25 **(d)**
Temperate phages are the avirulent lysogenic phages whose nucleic acids get incorporated in the bacterial DNA (lysogenization). When these phages infect bacteria, the phage genome interated tobacterial chromosome and bacterial cell undergoes many divisions.

26 **(c)**
Mushrooms (*Agaricus* sp.) are common edible fungi. Their fruiting bodies are used for eating

27 **(d)**
Animal cells do not have cell walls. Plants contains chloroplast (cholrophyll) and can make their own food. Animals cannot make their own food and are dependent on plants and other animals for food

28 **(d)**
Euglenoids

29 **(c)**
Five kingdom classification is proposed by RH Whittaker. The classification did not differentiated between the heterotrophic group fungi and the autotrophic green plants, through they also showed a characteristic differences in their walls composition-the fungi had chitin, while the green plants had cellulose

30 **(d)**
Slime mould forms an aggregation called *Plasmodium*, which may grow and spread over several feets. During unfavourable conditions, the *Plasmodium* differentiates and forms fruiting bodies bearing spores at their tips. Spores are extremely resistant and survive for many years

31 **(a)**
In Deuteromycetes, some members are saprophytes or parasites, while a large number of them are decomposers of litter and help in mineral cycling

32 **(a)**
Teichoic acid is present in cell wall of Gram positive bacteria. It is acidic polymer consisting of carbohydrate, phosphate and an alcohol. It binds metals, acting as receptor sites for some viruses and maintaining cells at low pH to prevent

degradation of cell walls by self-produced enzymes.

33 **(c)**
Gonyaulax.
Some dinoflagellates, such as *Gymnodinium* and *Gonyaulax* grows in large number in the seas and make the water look red and causes the red tides

34 **(d)**
Kingdom-Protista includes all unicellular eukaryotic organisms like crysophytes, dinoflagellates, euglenoids, slime moulds, protozoans, etc

35 **(a)**
The conidia and conidiophores are aseptate while mycelium and setae are septate.

36 **(a)**
As per Ainsworth's system of classification, *Rhizopus* comes under class-Zygomycetes (sub-division-Zygomycotina).

37 **(c)**
Hepatitis-B virus contains double stranded DNA, while Hepatitis-C, Hepatitis-E, Hepatitis-A and HIV contain single stranded RNA.

38 **(b)**
*Trypanosoma gambiense*causes west and central African sleeping sickness or Gambian fever. It is a fatal infection of the nervous and lymphatic systems that is endemic in certain parts of Africa. The vector of the flagellate is the tse-tse fly *Glossina*

39 **(d)**
*Paramecium coudatum*contains a smaller diploid micro-nucleus for reproduction and a large polyploid macro-nucleus which leads to metabolism.

40 **(c)**
The kingdom-Monera includes all prokaryotes, mycoplasma, bacteria, Actinomycetes and cyanobacteria of blue-green algae

41 **(d)**
The members of fungal class-Myxomycetes are called slime moulds. In the vegetative phase of their cycle, these are devoid of cell wall and are either a free living, multinucleate, amoeboid, slimy mass of protoplasm (*ie*, Plasmodium) or an aggregation of *Amoeba* (Pseudoplasmodium).

42 **(a)**
Halophiles are named so because they usually occur in salt rich substrata like salt pans, salt beds and salt marches, *e.g.*, *Halobacterium* and *Halococcus*

43 **(a)**
In the **lytic** cycle, a virus enters a cell and causes it to produce viral nucleic acid and protein coats. After this viral parts are assembled, the new virus particles may burst from the host cell or may leave the host cell by budding. In the **lysogenic** cycle, viruses enter into a long-term relationship with the cells they infect, their nucleic acid replicate as the cells multiply.

44 **(b)**
Potato leaf roll and leaf curl of papaya caused by viruses.

45 **(c)**
Euglenoids are unicellular flagellate protists. Their cell wall do not contain cellulose. The body is covered by thin and flexible pellicle. The pellicle is composed of fibrous elastin protein, small amount of lipid or/and carbohydrate. The euglenoids have two flagella, usually one long and one short. They are photosynthetic in the presence of sunlight. In dark even photosynthetic forms can behave like heterotrophic, predating on smaller organisms (holozoic) or feeding on organic remains (saprobic)

46 **(b)**
All archaebacteria share certain key characteristics:
(i) Their cell wall lack peptidoglycan (important component of cell wall of eubacteria).
(ii) Lipids in cell membrane of archaebacteria have different structure than those in all other organisms
(iii) Archaebacteria has distinct ribosomal RNA sequence.
(iv) Some genes of archaebacteria possess, introns unlike those of other bacteria.

47 **(a)**
Blast of rice or paddy is caused by the fungus *Pyricularia oryzae* of class-Deuteromycetes. *Magneporthe grisea*is perfect stage of *P. oryzae*. Red rot of sugarcane is caused by fungus *Colletotrichum falcatum* and its perfect stage is *Glomerella tucumanensis.*

48 **(b)**
Some bacteria like *Staphylococcus*, *Micrococcus*, *Salmonella*, *Pseudomonas*, *Escherichia*, *Clostridium*, etcsecr et endotoxins which

spoil food stuff and cause food poisoning.

49 **(a)**
All viruses are obligate parasites, as these are active, can multiply and show the living properties only when they have entered their host cell. The term obligate indicates some type of restriction in an organism's way of life from which it cannot depart and survive (*e. g.*, a virus and its host).

50 **(a)**
R H Whittaker (1969, an American taxonomist divided all the organisms into five kingdoms. These are kingdom-Monera, Protista, Fungi, Plantae and Animalia. Of these only kingdom-Monera contains prokaryotic organisms, whereas rest **four kingdoms** contain eukaryotic organisms.

51 **(b)**
MW Beijerink (1898) demonstrated that the extract of the infected plants of tobacco could cause infection in healthy plants and called the fluid as *Contagium vivum fluidum* (infectious living fluid)

52 **(a)**
Blakeslee (1904), while working with *Mucor* sp observed the heterothalism.

53 **(a)**
The rocky and barren place is deficient in water and lacks any organic matter, having only minerals in disintegrated or weathered state, the pioneer to colonies this primitive substration are **crustose** types of **lichen.**
Crustose lichens→ Foliose lichens → Moss→ Herbs → Shrub → tree.

54 **(b)**
Asexual spores formed by *Colletotrichum falcatum* (fungi imperfacti), *Sphaerotheca* (Ascomycetes) and *Rhizopus stolonifer*(Zygomycetes), all are unicellular, uninucleate, rounded to oval structures.

55 **(b)**
Bacterial cell wall is made up of peptidoglycan, protein, non-cellulosic carbohydrates, lipids, amino acid, etc.
Archaebacteria are characterised by the absence of peptidoglycan in their wall. Instead, the wall contains proteins and no-cellulosic polysaccharides.
Thermoacidophiles have duel ability to tolerate high temperature as well as high acidity. They often live in hot sulphur springs, where the temperature may be as high as 80°C and pH as low as 2, *e. g.*, *Thermoplasma, Thermoproteus*

56 **(a)**
Fungi are very large and divergent group of organisms. They lack chlorophyll, therefore, heterotrophic in nature. Their cell wall is formed of chitin (fungus cellulose).

57 **(c)**
Many fungi secrete antibiotics. The first antibiotic penicillin was discovered by Alexander Fleming in 1929 from *Penicillium notatum*. Now, penicillin is also extracted from *P. chrysogenum.*

58 **(c)**
Citrus canker is caused by an aerobic rod-shaped monotrichous bacterium, *Xanthomonas citri* (now known as *Xanthomonas axonopodis*).

59 **(d)**
Protista shows gametic and zygotic meiosis not sporic meiosis.

60 **(a)**
Trypanosoma, *Noctiluca*, *Monocystis* and *Giardia* are all unicellular protists.

61 **(c)**
Two kingdom system of classification was used till very recently. This system did not distinguish between the eukaryotes and prokaryotes. Unicellular and multicellular organisms and photosynthetic (green algae) and non-photosynthetic (fungi) organisms. Classification of organisms into plants and animals was easily done and was easy to understand, inspite, a large number of organisms did not fall into either category. Hence, the two kingdom of classification used for a long time, was found inadequate

62 **(c)**
The slime moulds are included in the division-Myxomycota by mycologist. The spores of slime moulds (acellular) germinate to produce biflagellates warm cells, which function as gametes.

63 **(b)**
Capsid is the protein coat that surrounds the central portion of nucleoid and enzymes. The capsid consists of a specific number and arrangement of small subunits called capsomeres. These capsomeres possess antigenic properties

64 **(d)**

In *Amoeba*, osmoregulation takes place by contractile vacuole by removing extra water from cytoplasm.

65 **(d)**
Yeast (*Saccharomyces*) are unicellular, degenerated, non-mycelial, saprobic fungi possessing no hyphae. But sometimes, chain of buds is formed during rapid growth, which may give false appearance of a mycelium and called as pseudomycelium.

66 **(a)**
Viroids are small, single stranded, circular RNA molecules not enclosed by protein coat. They were discovered by **T O Diener** in 1971. Viroid replication requires host encoded RNA polymerase.

67 **(d)**
All are correct except (d). *Noctiluca* is a colourless dinoflagellate. This alga is famous for bioluminescence.
Noctiluca (the night light) is a colourless dinoflagelate, which is an important constituent of coastal plankton of both temperature and tropical seas. This alga is famous for bioluminescence as it was the first dinoflagellate where bioluminescence was reported
The cellular slime moulds have the characters of both plants and animals. The reproductive phase is plant-like, as the spores have a cell wall composed of cellulose. However, vegetative phase is animal like having no cell wall and feeding like *Amoeba*

68 **(c)**
*Usilago*has haplontic life cycle. In their sexual phase, only zygospore is diploid structure. All others are haploid, such a sexual cycle is termed as haploid or haplontic.

69 **(d)**
In Ascomycetes, the mycelium is branched and septate. Yeast are an exception in that they are basically unicellular. In majority of Ascomycetes, the common mode of asexual reproduction is through the formation of conidia. Conidia are produced exogenously from the tips and sides of hyphae called conidiophores. Sexual spores are called ascospores which are produced endogenously in a sac like asci (sing. ascus). Ascospores are produced internally in each ascus. The asci may occur freely or get aggregated with dikaryotic mycelium to form fructification called ascocarps

70 **(a)**
Gametophyte stage The gamete producing phase in a plant characterised by alternation of generations

71 **(c)**
Ascomycetes belong to kingdom-Fungi.

72 **(c)**
Parameciumis filter feeder, nutrition is holozoic. It feeds on small Protozoa, unicellular plants (algae), diatoms, yeast, etc, and small bits of animals and vegetables.

73 **(a)**
Mycoplasmas are organisms that completely lack cell wall. They are the smallest living cells that can survive without oxygen. Many of them are pathogenic in plants and animals.

74 **(b)**
Bacteriophages is a virus that infects and replicates within bacteria. Bacteriophages are composed of proteins that encapsulate a DNA or RNA genome and may have relatively simple or elaborated structure

75 **(a)**
Kingdom-Protista includes all unicellular eukaryotic organisms like flagellates, diatoms, dinoflagellates, slime moulds, sarcodina etc.

76 **(b)**
Symbiosis (living together) is a special condition of mutualism, in which both the organisms (forming association) have close, permanent physical association, *e. g.*,**lichens**, in which fungi and algae form a close physical association.

77 **(d)**
As we know that bacterium divided after every 35 minutes through simple mitotic division
therefore, number of divisions are $\frac{175}{35} = 5$.Since, one bacterium on division produces two cells so, concentration after 175 minutes will be
$= 10^5 \times (2)^5$
$= 32 \times 10^5$

78 **(c)**
Phycobiont.
A lichen is structurally organized entity, consisting of the permanent association of a fungus and alga. The fungal component of a lichen is called mycobiont and the algal component is called phycobiont

79 **(a)**

Crop	Disease	Pathogen
Brinjal	Root knot	*Meloidogyne rubrilineans*
Sugarcane	Red stripe	*Pseudomonas*
Wheat	Earcockle	*Anguinia*
Pigeon pea	Wilt	*Fusarium exysporum*

80 **(d)**
In Basidiomycetes, the vegetative reproduction takes place by fragmentation.
Fragmentation is a form of asexual reproduction, where a new organism grows from a fragment of the parent

81 **(a)**
Incubation period of *Plasmodium vivax* is 10-14 days.

82 **(a)**
The plant cell have an eukaryotic structure with prominent **chloroplast** (A) and cell wall is made up of **cellulose** (B)

83 **(c)**
Fungi are achlorophyllous, eukaryotic organisms,*i. e.*, they lack **chloroplast** and, hence obtain their food as parasite or saprophyte.

84 **(c)**
Viruses are obligate parasites. If a mixture of viruses and bacteria are filtered through a bacterial proof filter, the viruses will pass through into the filtrate in the flask.
Virus were found to be smaller than bacteria because they passed through bacteria proof filters. Viruses are made up of proteins and DNA or RNA

85 **(c)**
During unfavorable conditions, *Amoeba* reproduced by forming a protective covering or cyst wall around it and multiple fission.

86 **(b)**
Lomasomes are the invagination either in the form of an infolded convoluted pocket or pouch enclosing granular or vesicular material. These structures are found in fungal membrane and named lomasomes by **Moore** and **McLear** (1961).

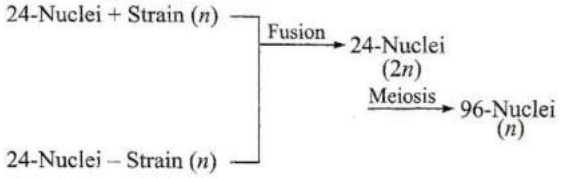
87 **(c)**
Viruses are nucleoproteins having one or more nucleic acid molecule, either double stranded or single stranded DNA or RNA, encased in a protective coat of protein or lipoprotein

88 **(a)**
TMV (Tobacco Mosaic Virus) contains single stranded RNA.

89 **(b)**
As F-factor can remain in integrated form with main bacterial genome, so it is an **episome.**

90 **(c)**
Viruses are so primitive that many scientists consider them to be both living and non-living things. By itself, a virus is a lifeless particle that cannot reproduce. But inside a living cell, a virus becomes an active organism that can multiply hundreds of times

91 **(c)**
Sexual reproduction in *Rhizopus* takes place by gametangial capulation.



92 **(b)**
Protista.
The kingdom- Protista was proposed by Ernst Haeckel (1866). Although all single celled eukaryotes are placed in kingdom-Protista yet its boundaries are not well defined

93 **(a)**
In Deuteromycetes, the mycelium is septate and branched. Coenocytic forms are not known

94 **(b)**
The kingdom-Monera includes all prokaryotes-mycoplasma, bacteria, Actinomycetes and cyanobacteria or blue-green algae. All unicellular eukaryotic organisms were placed in kingdom-Protista. Kingdom Protista has brought together *Chlmydomonas*, *Chlorella* (earlier placed in algae within plants and both having cell walls) with *Paramecium* and *Amoeba*, which were earlier placed in the animal kingdom, which lacks cell wall. It has put together organisms, which, in earlier classification were placed in different kingdoms. This happened because the criteria for classification changed. This kind of changes will take place in future too depending on the improvement in our understanding of characteristics and evolutionary relationships. Overtime, an attempt has been made to evolve a classification system which reflects not only the morphological, physiological and reproductive

similarities, but is also phylogenetic, *i.e.,* is based on evolutionary relationships

95 **(a)**
The sexual reproduction in fungi completes in three phases
(i) Plasmogamy (ii) Karyogamy (iii) Meiosis
Fusion of protoplasms between two motile or non-motile gametes is called plasmogamy
1. Fusion of two nuclei is called karyogamy
2. Meiosis in zygote results in the formation of haploid spores

96 **(b)**
Chemosynthetic autotrophic bacteria oxidises various inorganic substances such as nitrates, nitrites and ammonia and use the released energy for their ATP production. They plays a great role in recycling nutrients like nitrogen, phosphorus, iron and sulphur

97 **(d)**
Prokaryotic cell is found in bacteria. These cells lack nucleus and membrane bound cell organelles, which are present in plant ceill (eukaryotic type).

98 **(d)**
Basidiomycetes include not only the mushrooms, toadstools, puffballs, jelly fungi and shelf fungi, but also many important plant pathogens among the groups called **rusts** and **smuts**. All these fungi bear characteristic fruiting bodies called basidiocarps.

99 **(d)**
Ustilago belong to class-Basidiomycetes

100 **(c)**
The body of a fungus (except yeast) is made up of number of elongated, tubular filaments known as hyphae. The mass of network of hyphae is called mycelium

101 **(d)**
Monerans include prokaryotic bacteria and cyanobacteria which lack nuclear membrane and membrane bound cell organelles but have DNA and RNA.

102 **(c)**
The main types of locomotary organs in Protozoa are pseudopodia (*e.g., Amoeba*), flagella (*e.g., Euglena, Trypanosoma*) and cilia (*e.g., Paramecium*), while parapodium are found in polychaete annelid worms.

103 **(b)**
Slime moulds are commonly found on dead and decaying leaves, twigs, logs of wood and the other decaying vegetable matter

104 **(c)**
Viruses inhabiting in bacteria.
Bacteriophages is a virus that infects and replicates within bacteria. Bacteriophages are composed of proteins that encapsulate a DNA or RNA genome and may have relatively simple or elaborated structure

105 **(d)**
Fungi shows sexual reproduction by oospores, ascospores and basidiospores. The various spores are produced in distinct structures called fruiting bodies

106 **(d)**
Black rust of wheat is caused by
Puccinia graminis tritici

107 **(a)**
Dinoflagellates.
Some dinoflagellates, such as *Gymnodinium* and *Gonyaulax* grows in large number in the seas and make the water look red and causes the red tides

108 **(d)**
Puccinia graminis tritici belongs to class-Basidiomycetes. It causes black rust of wheat.

109 **(a)**
When the flagella are found on whole body of the bacterium, they are called **peritrichous**, *e.g., Salmonella.*

110 **(b)**
In fungi, at the time of sexual reproduction, the cytoplasms of two sex cells fuses with each other. The nuclei of two sex cells come close to each other but do not fuse. Thus, the resulting cell becomes binucleate or dikaryon. The phenomenon is sometimes termed as dikaryotisation

111 **(a)**
Bacteria are prokaryotic microscopic, unicellular cell wall bearing organisms, which contain bacteriochloropyll. Majority of the bacteria multiply by transverse **binary fission,** in which a single cell is divided into two equal sized cells by developing a cell wall.

112 **(b)**
Episome is an extrachromosomal hereditary material of bacteria incorporated into the bacterial chromosomes or nucleoid. Hereditary DNA of bacterial cell is known as nucleoid.

113 **(c)**
Wound tumour virus is a double stranded RNA (dsRNA) containing plant infecting virus. Reovirus also contains double stranded RNA molecule.

114 **(b)**
*Frankia*cannot fix nitrogen in the free living state.

115 **(a)**
Soft-rot disease of sweet potato is caused by *Rhizopus stolonifer*. This is a very destructive disease. It is prevalent in almost all sweet potato growing states of India, such as Uttar Pradesh, Bihar, Orissa, West Bengal, Tamil Nadu and Kerala.

116 **(c)**
Bacterial chromosomes are circular DNA molecules.

117 **(c)**
Hyphae.
The body of a fungus (except yeast) is made up of number of elongated, tubular filaments known as hyphae. The mass of network of hyphae is called mycelium

118 **(d)**
Viruses are known as a connecting link between non-living and living beings. These are thought to be non-living as they do not show any sign of life outside the host and are able to be crystallized but they show the characters of living beings as they are able to multiply (only inside the host), can cause disease in host and undergo mutation.

119 **(c)**
Methanogens occurs in marshy areas where they convert formic acid and carbon dioxide into methane with the help of hydrogen. This capability is commercially exploited in the production of methane (biogas) from the dung of cows and buffaloes

120 **(a)**
Contractile vacuole in *Amoeba* is concerned with osmoregulation, *i. e.*, removal of excess of water. It is present in the endoplasm of *Amoeba* in the posterior part (near the trailing end) and seen as a clear single rounded and pulsating vacuole, which is enclosed by unit membrane.

121 **(b)**
*Mucor*is a saprophytic fungus belonging to the order-**Mucorales** and family-**Mucoraceae** and grows on decaying dung and on some food stuffs. *Mucor*shows the best growth on a piece of bread at a temperature of about 25°C, relative humidity of about 95% in a moist and shady place.

122 **(b)**
*Rhodospirillum*is a free-living, anaerobic, nitrogen fixer. Both *Beijernickia* and *Azotobacter* are free-living, nitrogen-fixing, aerobic microbes. *Rhizobium*is a symbiotic, nitrogen-fixer.

123 **(a)**
Morchella Commonly known as sponge mushroom is a saprophytic fungus. The edible part of mushroom is the fruiting body basidiocarp. The common mushroom are Agaricus bisporus.Lentinus, Volvariella, Pleurotus, etc.

124 **(c)**
Casuarina tree has nitrogen fixing root nodules that harbor a filamentous streptomycete like symbiotic nitrogen fixing organism, called *Frankia*

125 **(c)**
The genomes of viruses can be composed of either DNA or RNA. Usually plant viruses contain RNA but there are many plant viruses, which contain DNA as genetic material. Similarly, animal viruses usually contain DNA but there are many animal viruses, which contain RNA as genetic material.

126 **(a)**
In the five-kingdom classification, *Chlamydomonas* and *Chlorella* have been included kingdom-Plantae

127 **(c)**
The accumulated food reseve in fungi is **glycogen**.

128 **(b)**
Yeast (*Saccharomyces cerevisae*) is an unicellular fungus because some fungal hyphae of *S. cerevisae* grow in such a way that they give the appearance of Pseudomycelium.

129 **(c)**
Acquired Immuno Deficiency Syndrome(AIDS) is caused due to the infection of Human Immunodeficiency Virus (HIV). This virus belongs to retroviral family and contains two single strands of RNA as genetic material.

130 **(a)**
The algal or cyanobacterial cells are photosynthetic, and possess the green pigment, chlorophylls enabling them to use sunlight's energy to make their own food from water and

CO_2 through photosynthesis. They also provides vitamins to the fungus

131 **(a)**
Amoeboid, flagellates, ciliates, sporozoans.
On the basis of locomotory organelles, the protozoans are divided into four groups Flagellated protozoans, amoeboid protozoans, sporozoans and ciliated protozoans

132 **(d)**
In addition to proteins, viruses also contain genetic material that could be either RNA or DNA, not the both. They have no cell wall, cytosol, ribosomes, etc. Bacteria have cell wall, cytosol, ribosomes and both DNA and RNA.

133 **(b)**
Viral genome incorporated into host DNA is called **prophage**. Most of the prophage genes are repressed by two repressor proteins that are the product of phage genes.

134 **(b)**
Maximum number of antibiotics are obtained from bacteria. About 2100 antibiotics have been isolated from Actinomycetes (mycelial bacteria), while a single species of *Streptomyces* (*S. griseus*) is known to form more than 40 antibiotics. Bacteria like *Bacillus subtilis* alone produce around 60 antibiotics.

135 **(a)**
Glycogen is the storage form of glucose in animals and humans. Glycogen is synthesised and stored mainly in the liver and the muscles. Excess of glucose in body gets converted into fats

136 **(a)**
Many Gram positive and Gram negative bacteria have a regular structured layer called **slime-layer** on their surface. It may protect the cell against ion and pH fluctuations, osmotic stress, enzymes etc.

137 **(a)**
Some plants may be partially heterotrophic as in the case of insectivorous plants like *Drocera*, *Nepenthes* and venus fly trap.
Insectivorous plants can capture and digest live prey, to obtain nitrogen compounds that are lacking in its usual marshy habitat.
The plant cell have an eukaryotic structure with distinct nucleus, prominent chloroplast and cell well is made up of cellulose

138 **(b)**
Mycoplasmas are the smallest known anaerobic, Gram negative prokaryotes without a cell wall. These are also known as Pleuro Pneumonia Like Organisms (PPLOs). These cause pleuropneumonia in humans and cattles.

139 **(a)**
A lichen is structurally organised entity, consisting of the permanent association of a fungus and alga. The fungal component of a lichen is called mycobiont and the algal component is called phycobiont

140 **(a)**
Lichen is a symbiotic association of algae and fungi. According to a view for the nature of association in lichen, the relationship between fungus and the algal partner, is an example of symbiosis but fungus in his partnership has an important role. The algal partner lives as a subordinate partner the association between the two partners is thus, described as beneficial salavary for the alga. A term **helotism** is used for this kind of association.

141 **(a)**
The cell wall of fungi is made up of chitin instead of cellulose as found in higher plants.

142 **(b)**
St. Anthony's fire disease is caused by ingesting rye flour containing poisons produced by a fungus *Claviceps*.

143 **(b)**
During erythrocytic schizogony, micro metacryptomerozoites enter into the blood stream and each enters the red blood corpuscles and assumes rounded disc-like shape with single nucleus.

144 **(b)**
Common cold is a viral disease. Influenza virus is rounded or oval in shape, contains RNA in an inner helical core of ribonucleoprotein surrounded by mucoprotein

145 **(a)**
OT Diener.
Viroid were discovered by TO Dianer in 1971 as a new infectious agent that was smaller than viruses. Viroids lack capsid and have not proteins associated with them

146 **(c)**
Phytoalexins are phenolic compounds, which are not present in healthy plants but are produced upon stimulation of a plant by pathogen or by a

mechanical or chemical injury. These are fungitoxic substances and inhibit the growth of microorganisms pathogenic to plants.

147 **(a)**
Viruses are obligate parasite. They are inert outside the specific host cell and exists in crystalline forms as demonstrated by WM Stanley

148 **(c)**
Pasteurization is a method of partial sterilization which involves heating of milk at 65°C for 30 min or at 72°C for atleast 15sec followed by rapid cooling or at 132°C for at least 1sec. This technique is widely used to kill all pathogenic bacteria in food without achieving complete sterility

149 **(d)**
Kingdom-Monera includes all prokaryotes (autotrophic or heterotrophic) *viz*, mycoplasmas, bacteria,Actinomycetes (mycelia bacteria) and photosynthetic cyanobacteria, while all unicellular eukaryotic organisms like flagellates, diatoms, dinoflagellates, slime moulds, sarcodina, etc, are included in kingdom-Protista.

150 **(b)**
In 1969, American biologist, Robert H Whittaker proposed five kingdom classification. The main criteria for classification used by him include cell structure, thallus organization, mode of nutrition and reproduction.

151 **(c)**
Cyanobacteria may be unicellular, colonial or filamentaous. Each filament consists of a sheath of mucilage and one or more cellular strands called trichomes

152 **(b)**
Chemosynthetic autotrophic bacteria.
Chemosynthetic autotrophic bacteria oxidises various inorganic substances such as nitrate, nitrites and ammonia and use the released energy for their ATP production. They plays a great role in recycling nutrients like nitrogen, phosphorus, iron and sulphur

153 **(d)**
The **symbiotic relationship** between fungal hyhae and root of higher plant is known as mycorrhiza. Endomycorrhiza (also called VAM) occurring in about 80% of vascular plants. In this association the penetrating hyphae form finely branched haustorial branches or coils vesicles.

154 **(b)**
Ascomycetes are commonly known as sac fungi, due to their sac-like appendage that holds the spores.
The Ascomycetes are unicellular, *e. g.*, yeast or multicellular, *e.g.,* penicillium

155 **(a)**
All protozans are heterotrophs and live as the perdators or parasites

156 **(d)**
In *Rhizopus*, sexual reproduction takes place by the fusion of two **multinucleate** gametangia. Occasionally, fusion does not take place between gametangia and these gametangia are surrounded by a many layered wall and then develop into multinucleate **azygospores** (parthenospore).

157 **(c)**
Bacteria represent a prokaryotic cell, *i.e.,* lacks nuclear membrane and membrane bound cell organelles like mitochondria, chloroplast, endoplasmic reticulum, Golgi body, etc.

158 **(a)**
In his five kingdom classification, Whittaker excluded viruses, viroids and lichens

159 **(c)**
Sulphur and phosphorus cycle are sedimentary cycle.

160 **(c)**
Sporophyte stage The spore producing phase in the life cycle of a plant that exhibits alternation of generations

161 **(c)**
The term 'holozoic nutrition' refers to the type of nutrition in which organisms feed by engulfing or ingesting complex organic food material, which is subsequently digested and absorbed. This type of nutrition is seen in *Amoeba*, *Paramecium*, chordates, etc.

162 **(a)**
A closed fruit or ascocarp is called the **cleistothecium**. The cleistothecium of *Penicillium* repesents parent haplophase, dikaryophase and future haplophase.

163 **(a)**
Transduction involves the picking up of DNA by bacteriopage from one bacterial cell and carrying in to another where the DNA fragment may get incorporated into the bacterial host's genome.

164 **(a)**
Contractile vacuoles and food vacuoles are absent in the class-Sporozoa.

165 **(c)**
The mutually beneficial or symbiotic association of a fungus with the root of a higher plants is known as mycorrhiza. The fungus is dependent upon the higher plants for shelter and food

166 **(b)**
A lichen is structurally organised entity consisting of a permanent association of a fungus and an alga. The fungal component of a lichen is called mycobiont and the algal component is called phycobiont

167 **(b)**
Fungi is a group of eukaryotic, achlorophyllous, non-photosynthetic heterotrophic organisms of diverse forms, size and mode of reproduction. Fungicause a number of plant and animal diseases, *e. g.*, black rust of wheat, red rot of sugarcane, late blight of potato, etc.

168 **(a)**
Curing of tea leaves is brought about by the activity of bacteria. It is essentially an oxidation dry fermentation process, during which water is driven, the green colour is lost and the leaves assume a tougher texture and undergo chemical changes.

169 **(b)**
Aristotle was the earliest to attempt a more scientific basis for classification. He used simple morphological characters to classify plants into trees, shrubs and herbs. He also divided animals into two groups, those which had red blood and those that did not

170 **(c)**
Life cycle of plants has two distinct phase, the haploid gametophyte and diploid sporophyte generations that alternates with each other

171 **(a)**
Bacterial flagellum us made up of protein called **flagellin**. These protein molecules are globular and are arranged in 3-8 spiral rows.

172 **(b)**
All are correct except IV and V
Some unicellular fungi like yeast, are used to make bread and beer, *Ustilago* is responsible for smut disease
Puccinia graminis tritici is responsible for black rust of wheat

173 **(b)**
In lichens, the fungal partner provides protection, anchorage and absorption for the alga.

174 **(d)**
*Amoeba*is not a photoautotrophic animal instead it takes food from their surroundings. *Amoeba*is an omnivorous animals because it takes algae, bacteria and other similar microorganisms. It takes food with the help of pseudopodia. Food particles are taken by endocytosis process, *i. e.*, holozoic nutrition.

175 **(a)**
The bacterial flagellum is long, filamentous and protoplasmic appendage, arise in the cell envelope. In the bacterial flagella, instead of 9+2 arrangement of tubulin there is simply a single filament of globular protein called **flagellin.**

176 **(a)**
Viruses did not find a place in classification since they are not truly living

177 **(b)**
The denitrifying bacteria reduce the nitrates and the ammonium salts to free nitrogen which escapes into the atmosphere.
e. g., *Bacillus denitrificans*. This process decreases fertility of the soil.

178 **(d)**
Anthrax is an acute disease caused by the bacterium *Bacillus anthracis*

179 **(a)**
The name virus that means venous or poisonous fluid was given by Pasteur. DJ Ivanowsky (1892) recognised certain microbes as causal organism of the mosaic disease of tobacco

180 **(b)**
Protozoans lack cell wall. Cell wall is the characteristic feature of plant cells. Slime moulds are diploid, *e. g.*, *Physarum*. Dinoflagellates are motile, *e. g.*, *Noctiluca*, *Peridinium*, etc. The body of *Euglena* is covered with pellicle.

181 **(a)**
TMV is a plant virus and viruses can grow only in living host, not in artificial media.

182 **(b)**
The siliceous cell walls of diatoms are indestructible (*i.e.*, do not decay easily). They were collected over millions of years on the sea floors, called diatomite or diatomaceous earth or silica gel. These deposits may extends for several hundred metres in certain areas

183 **(a)**

The common example of class-Basidiomycetes are smut, rusts, mushrooms, toad stools, puff balls and pore fungi.

184 **(d)**
Kingdom-**Protista** includes a wide variety of unicellular, mostly aquatic eukaryotes. There are believed to evolved from prokaryotic monerans and are the precursors from which higher organisms evolved.

185 **(c)**
The bacterial cell wall contains peptidoglycan or mucopeptide or murein with diaminopimelic acid, lipid and protein. Chemically, peptidoglycan is composed of N-acetyl glucosamine **(NAG)** and N-acetyl muramic acid **(NAM)**.

186 **(c)**
Noctiluca (the night light) is a colourless dinoflagelate, which is an important constituent of coastal plankton of both temperature and tropical seas. This alga is famous for bioluminescence as it was the first dinoflagellate where bioluminescence was reported.
The cellular slime moulds have the characters of both plants and animals. The reproductive phase is plant-like, as the spores have a cell wall composed of cellulose. However, vegetative phase is animal like having no cell wall and feeding like *Amoeba*

187 **(a)**
VAM is **Vesicular-Arbuscular Mycorrhiza,** a symbiotic association of roots of higher plants with fungi, usually give benefit to plant by providing **phosphorus**.

188 **(d)**
Sporozaons includes diverse organisms that have an infectious spore like stage in their life cycle

189 **(d)**
Muscarine poisoning is caused by *Amanita* varieties. Early symptoms after injection of this chemical, within two hours include increased respiration, salvation, nausea, vomiting, abnormal pair, thirst and mucous.

190 **(d)**
All are correct. The members of flagellated protozoans are either free living or parasitic. They bears flagella. The parasitic forms of flagellated protozoans causes diseases such as sleeping sickness, *e. g.*, *Trypanosoma*

191 **(b)**
On the basis of locomotory organelles, the protozoans are divided into four groups. Flagellated protozoans, amoeboid protozoans, sporozoans and ciliated protozoans

192 **(a)**
Myxomycota constitutes first division of the kingdom fungi. These are distinguished from other fungi by the presence of a **vegetative phase** in their life cycle, which is devoid of cell wall and is either a free-living, multinucleate, amoeboid mass of protoplasm (Plasmodium) or an aggregation of amoebae in the form of slimy mass (during the vegetative phase), these are also called slime moulds. The spores are biflagellate in slime moulds.

193 **(a)**
Isogamous means similar in morphology

194 **(d)**
Viruses consist of nucleoprotein, *i. e.*, nucleic acid+protein.

195 **(d)**
Members of Ascomycetes are saprophytic, decomposers, parasitic or ceprophilous (growing on dung)

196 **(b)**
Endospores are highly resistant, physiologically dormant, single called structures formed usually inside a bacterium mother cell. The mature endospore is highly dehydrated, shows no metabolic activity and is resistant to heat, radiations or attack by enzymatic or chemical agents. Under favorable environmental conditions, the endospore germinates and vegetative cell comes out and grows.

197 **(a)**
Bacterial blight of paddy or rice caused by *Xanthomonas oryzae*. It is a rod-shaped, aerobic, non-capsulated, non-spore forming, Gram negative bacterium. It has a single polar flagellum.

198 **(c)**

Crop	Disease	Pathogen
Brinjal	Root knot	*Meloidogyne rubrilineans*
Citrus	Canker	*Xanthomonas citri*
Potato	Late blight	*Phytophthora infestans*
Pigeon pea	Seed gall	*Fusarium udum*

199 **(b)**

Nitrosomonas converts NH_3 into nitrite and then, *Nitrobacter* converts nitrite into nitrate.

200 **(a)**
In plants, nutrition is typically autotrophic. Parasite forms are heterotrophic. A few plants, such as *Drocera* and *Nepenthes*, are insectivorous to get additional nitrogen. Otherwise there principal nature as autotrophic

201 **(a)**
Bacteria with one flagella attached at one end is called **monotrichous**. In **lophotrichous**, two or more flagella are attached at one end. In **peritrichous**, flagella are distributed all over the surface of the bacteria.

202 **(a)**
Import is the process in which food is sucked by depression into the body and there is no active role or movement of *Amoeba* takes place.

203 **(a)**
Yoghurt consists of pasteurized homogenized whole milk that is incubated with *Streptococcus thermophillus*, *Lactobacillus bulg* or *Lactobacillus casei*.

204 **(b)**
The members of class-Ascomycetes are called sac fungi. Yeast (*Saccharomyces* is an unicellular ascomycetous fungus.

205 **(d)**
Viruses are obligate intracellular parasites. They are intermediates between living and non-living entities.

206 **(c)**
In dinoflagellates, cells are generally covered by a rigid coat, the theca or lorica of articulated and sculptured plates formed of cellulose. Because of the presence of sculptured plates, these protists are of ten types known as armoured dinoflagellates

207 **(b)**
Viruses are non-cellular, infectious, obligate intracellular parasites. These are genetic elements (DNA or RNA) wrapped in a protein coat and are not considered to be living organisms, as they cannot reproduce independently.

208 **(d)**
Lichen is a composite organism formed by the symbiotic association of a green alga or a cyanobacterium and a fungus, usually from the Ascomycota or Basidiomycota.

209 **(a)**
Parasexuality is a type of life cycle in which plasmogamy, karyogamy and haplodization takes place but not at specific place, it was discovered in fungi (*Aspergillus nidulans*) by **Pontecarvo** and **Roper** in (1952).

210 **(a)**
Plants are not heterotrophic, these are autotrapic and make their own food through photosynthesis

211 **(d)**
Biological classification is the scientific procedure of arranging organisms, into groups and sub-groups on the basis of their similarities and dissimilarities and placing the groups in a hierarchy of categories
Whittaker has used five criteria for delimiting the different kingdoms
(i) Complexity of cell structure, *i.e.,* prokaryotic and eukaryotic
(ii) Complexity of body structure or structural organisation of unicellular and multicellular
(iii) Mode of nutrition, which is divergent in multicellular kingdoms, photoautotrophy in Plantae, absorptive heterotrophy in Fungi and ingestive heterotrophy in Animalia
(iv) Ecological life style like producers (Plantae) decomposers (Fungi) and consumer (Animalia)
(v) Phylogenetic relationships

212 **(a)**
AIDS virus also called reovirus has two single strands of RNA associated with the enzymes reverse transcriptase.

213 **(b)**
Fungi are the achlorophyllous, heterotrophic thallophytes, which act as **decomposers** (*i. e.*, saprotrophs, which decompose the organic remains by secreting extracellular digestive enzymes) in forest ecosystems.

214 **(b)**
Lysozyme is an enzyme that breaks down bacterial cell walls and provides protection against bacterial invasion in the skin, mucus membrane and many body fluids. It is found in tears sweat and saliva.

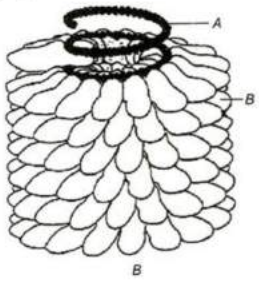
215 **(b)**
It is correct that in *Agaricus*, gills produce basidiospores, whereas in *Cycas* megasporophylls produce megaspores and microsporophylls pollen grains. In *Aspergillus*, fruiting body (ascocarp) is ball like

'cleistothecium' and in *Funaria*, capsule represents the sporophytic generation.

216 **(d)**
Basidiomycetes includes mushroom/bracket fungi/ puffballs.
The class-Basidiomycetes includes those members that produce their basidia and basidiospores on or in a basidiocarp

217 **(c)**
Fungus or lichen which grows on wood is called lignocolous.

218 **(c)**



A-RNA, B-Capsid, C-Tobacco mosaic virus

220 **(a)**
Neurospora is widely used in genetics as a model organism because it is quickly reproducing, easy to culture and can survive on minimal media

221 **(a)**
In bacteria, the genetic material (hereditary material) is DNA, which lacks histone proteins but contains some basic proteins.

222 **(d)**
The **plant viruses**– Tobamo viruses (tobacco mosaic virus, tomato mosaic virus); Potex viruses (potato virus-X, papaya mosaic virus); yellow mosaic virus, tobacco necrosis virus alpha mosaic virus; satellite tobacco necrosis virus and some animal viruses- Togaviruses, Picornaviruses (Poliovirus), etc, contain single stranded RNA.

223 **(a)**
Chlamydospore is a specially modified thick-walled resting cell. The sporidia of *Sphacelotheca* fuse in pair and form dikaryotic mycelium. Individual cells of the hypae round off, nuclei of the cell fuse and the cell develop a thick wall around them like chlamydospore.

224 **(d)**
Litmus is obtained from lichen species like *Roccella tinctoria*, *Roccella montagnei*and *Lasallia pustulata*.

225 **(c)**
Genophore term was coined by **Hans Ris** for bacterial chromosome.

227 **(d)**
The fungal cell wall contains glucons that is also found in plants and also found in plants and also chitin (a polymer of N-acetylglucosamine) that does not found in the plant kingdom. In contrast to plants and oomycetes, fungal cell wall do not contain cellulose. However, a type of fungal cellulose may preset in fungal cell walls.

228 **(d)**
The cell wall of bacterium is made up of **peptidoglycan** (murein, mucopeptide). Peptidoglycan is formed of heteropolysaccharide chains cross-linked by short peptides (generally tetrapeptides).

229 **(d)**

Column I	Column II
Pasteurella pesitis	Plague
Treponema pallidum	Syphilis
Mycobacterium bovis	Actinomycosis of cattle, cats and dogs
Streptomyces nodolus	Angular leaf spot disease of
Xanthomonas malvacearum	Cotton

230 **(a)**
Transduction is a process, in which a bacteriophage (virus) takes part in genetic recombination in bacteria.

231 **(d)**
Bacteria are ubiquitous being found in all places where organic matter is present in water, air, soil, over and inside the bodies of various organisms. They can tolerate extreme environments like hot springs, frozen waters, deserts, deep oceans, acidic, alkaline and saltish conditions

232 **(b)**
Cyanobacterial cells are larger and more elaborate than bacteria. Cell structure is typically prokaryotic one, envelope organisation with peptidoglycan wall, naked DNA 70S ribosomes and absence of membrane bound structures. The cell wall is four layered with peptidoglycans present in the second layer

233 **(a)**

Cell wall of almost all eubacteria is made up of murein (or mucopeptide) consisting of peptide portion and a sugar portion.

234 **(a)**
*Rhizobium*is a nitrogen fixing bacterial symbiont of leguminous roots. It fixes the atmospheric nitrogen (N_2)into nitrate as to make the soil N_2 rich.

235 **(b)**
Formation of nitrogen from nitrate is known as denitrification. This process is carried out by some members of genera—*Pseudomonas*. Denitrification results in the loss of soil nitrogen thus, adversely affects soil fertility.

236 **(b)**
Most of the ammonia produced in the soil is acted upon by nitrifying bacteria and ammonia is changed to nitrate The reaction occurs in two steps **nitrite formation**(*e. g.*, *Nitrosomonas*) and **nitrate formation**(*e. g.*, *Nitrobacter*).

237 **(b)**
The dinoflagellates are important component of phytoplankton. Most of them are marine but some occur in freshwater. Nutrition is photosynthetic in dinoflagellates

238 **(a)**
All are correct except III. Desmids are mainly found in freshwater and are usually indication of clean (unpolluted) water

239 **(b)**
The fungus *Amanita phalloides* produces toxins like α-aminitin, phalloidin, etc, which is deadly poisonous. Hence, this fungus is considered as deadliest mushroom.

240 **(b)**
During sexual reproduction in *Rhizopus*, (+) and (-) strains of mycelia simulate each other through pheromone like trisporic acid to form zygophores. Zygophores of two strains come in contact to form progametangia then coenogametangia. Then after gametangial copulation, zygospores with warty wall layer are formed which germinate in favorable conditions and form a germ tube.

241 **(a)**
Structurally viruses are very diverse, varying widely in size, shape and chemical composition. The nucleic acid of virus is always located within the virion particle and surrounded by a protein shell called capsid.

242 **(c)**
Encystment of *Amoeba* is occurred regularly to tide over unfavorable conditions like drought and extreme temperature, etc.

243 **(b)**
Bacteria are helpful in making curd from milk, production of antibiotic, fixing nitrogen in legume roots, etc. Some bacteria are pathogens, causing damage to human being, crops, farm animals and pets. Cholera typhoid, tetanus, citrus canker are well known diseases caused by different bacteria

244 **(c)**
Zygospore is a dormant stage. It is formed due to fusion of two gametangia. The zygospore, so formed develops a dark coloured thick wall and undergoes rest, *i. e.*, dormancy.

245 **(c)**
Cyanobacteria are members of Cyanophyceae or Myxophyceae, which are commonly called blue-green algae and have pigment *c*-phycocyanin, *c*-phycoerythrin alongwith chlorophyll-*a*, β-carotene and myxoxanthin.

246 **(c)**
Porins are the protein trimers with central channels. These occur in the outer wall layer or outer membrane in Gram negative bacteria. The Gram negative bacteria detect and respond to chemicals in their surroundings by porins.

247 **(d)**
The members of fungal class-Myxomycetes are commonly called true slime moulds. These are saprophytic and their vegetative phase is represented by a free living irregularly shaped mass of protoplasm without walls and having several diploid nuclei embedded in it. It is called plasmodium. During reproduction, slime moulds produce haploid spores, which are dispersed by air currents, rain and mites.

248 **(d)**
A-spores; B-highly resistant.
Slime mould forms an aggregation called *Plasmodium*, which may grow and spread over several feets. During unfavourable conditions, the *Plasmodium* differentiates and forms fruiting bodies bearing spores at their tips. Spores are extremely resistant and survive for many years

249 **(a)**
The name virus that means venom or poisonous fluid was given Pasteur

250 **(b)**

The nucleic acid of virus is surrounded by a protein shell, called capsid.

251 **(d)**
*Albugo*is a phycomycetous fungus. Chrysophytes include diatoms and golden algae (demids).

252 **(c)**
*Paramecium*has micro-nucleus for trophic function and one or more micro-nuclei for reproduction.

253 **(c)**
Asexual reproduction takes place by zoospores (motile) or by aplanospores (non-motile). These spores are endogeneously produced in porangium. Spores are single-celled propagules, which separates from the parent organism and get dispersed

254 **(a)**
Dikaryophase of fungus occurs in Ascomycetes and Basidiomycetes

255 **(c)**
In *Entamoeba histolytica*, the tetranucleate cysts constitute the transmissive or infective stage, which do not develop further but pass out from the host in faeces. These are highly resistant to desiccation and survive for about 12 days. Their infection depends upon the intake of contaminated food or water.

256 **(c)**
Coenocytic, multinucleat and aseptate mycelium is present in class-Phycomycetes, *e. g.*, *Albugo*

257 **(a)**
The chitin (polyglycosamine) is an acetate of mucopolysaccharide called glycosamine, which is formed by the combination of polysaccharide with small peptide molecules. The basic unit (monomer) of chitin is N-acetyl glucosamine. Monomers are joined by $1-4\beta$ linkages.

258 **(b)**
Heterotrophic bacteria are dependent on other organisms for nutrition. Heterotrophic nutrition involves obtaining of ready-made organic nutrients from outside sources. It is of further three types; saprotrophic, symbiotic and parasitic

259 **(d)**
Class-Deuteromycetes have no sexual reproduction and are consequently called the fungi imperfecti

260 **(a)**
*Azotobacter*is free-living, aerobic non-photosynthetic nitrogen fixing bacterium.
*Nostoc*is free living and symbiotic photosynthetic nitrogen fixing cyanobacteria.

261 **(d)**
The kingdom-Animalia includes sponge, corals, worms, insects, snails, star fishes, bony fishes, frogs, lizards, snakes, twitles, crocodiles, birds and mammals.
These organisms are heterotrophic, multicellular, eukaryotes without chlorophyll. Heterotrophic organisms cannot synthesise its own food and is dependent on complex organic substances for nutrition

262 **(a)**
The members of order-Uridinales (Basidiomycetes) are known as rust fungi. Black stem rust of wheat is caused by *Puccinia graminis tritici*.

263 **(a)**
The causative agent of late blight of potato is fungus *Phytophthora infestans*, class-Oomycetes, order-Peronosporales, and family-Pythiaceae. In India, the late blight of potato is a seed borne disease.

264 **(a)**
T-series bacteriophages, in their appearance resemble a tadpole or spermatozoid and are differentiated into a head and a tail.

265 **(d)**

Plant Disease	Casual Organism
Brown rot of potato	*Pseudomonas solanacearum*
Rust of wheat	*Puccinia graminis*
Potato leaf roll	Potato leaf roll virus
Sugarcane mosaic	Sugarcane virus-I

266 **(c)**
Slime moulds lacks chlorophyll and are heterotrophic in their mode of nutrition. They generally, lives as saprotophs except a few, which are parasites on algae, other fungi and flowering plants

267 **(a)**
Free living protozoan has **holozoic** mode of nutrition. They have no specific organ for intake of food. Holozoic nutrition involves engulfment of the whole or a part of a plant or animal, either in solid or in liquid state.

268 **(a)**
The protein coat of virus is called capsid which is made up of small subunits called **capsomeres** (A), which protects the **nucleic acid** (B)

269 **(b)**
R H Whittakerdivided living organisms into five kingdoms. Out of these, **Monera**include prokaryotes (bacteria, archaebacteria and cyanobacteria.

270 **(a)**
In *Euglena*, asexual reproduction occurs by longitudinal binary fission.

271 **(a)**
Morels and truffles belongs to Ascomycetes. The ascocarps of some Ascomycetes are edible, *e. g.*, morels and truffles

272 **(b)**
Chloromycetin is an antibiotic, which obtained from *Streptomyces venezualae*.

273 **(a)**
Ascomycetes (Gk. *askos*=sac; *mycete*=fungus) are a large group with over 30,000 species, includes diverse types such as brown, green, blue and pink moulds, powdery mildews, yeast, morels and truffles.
The mycelium is well developed and branched. The hyphae are septate and multicellular.
Majority of Ascomycetes reproduce asexually by the formation of conidia. Conidia are borne on special hyphae, called conidiophores.
The fructification of some Ascomycetes are edible and considered as delicacies e.g., morels, truffles.
Neurospora crassa is often employed in studies conducted in experimental genetics. It is often called *Drosophila* of plant kingdom

274 **(a)**
Penicillium and yeast.
Ascomycetes are commonly known as sac fungi, due to their sac-like appendage that holds the spores.
The Ascomycetes are unicellular, *e. g.*, yeast or multicellular, *e.g.,* penicillium

275 **(a)**
*Pseudomonas putida*is an example for plant growth promoting rhizobacterium, which produces iron chelating substance.

276 **(d)**
Protists are distinctly microscopic unicellular organisms. The cell structure is typically eukaryotic. Internally, the cells have distinct membrane bound organelles like nucleus with chromosome, mitochondria, Golgi bodies, endoplasmic reticulum, ribosomes (80S), etc. The nucleus consists of chromatin, nucleolus and nucleoplasm surrounded by porous nuclear envelope. Some motile protists may have flagella or cilia for locomotion

277 **(b)**
*Streptococcus*is a spherical, Gram positive bacteria (prokaryote). Membrane bound organelles are absent in prokaryotes.

278 **(b)**
Lactic acid formation is carried at one stage by *Rhizopus*.

279 **(a)**
Unicellular organisms such as *Amoeba*, *Paramecium* use organelles called contractile vacuoles for osmoregulation.

280 **(b)**
SARS (Severe Acute Respiratory Syndrome) spreads recently in China, Hongkong and Singapore, is a viral disease caused by paramyxo virus.

281 **(d)**
Diploid protists undergo meiosis to form four haploid gametes and the type of meiosis which occur in diploid protiss is gametic meiosis.

282 **(a)**
The element and compounds from the body of organisms constantly move back into the non-living world during the life and death of the organisms. This recycling of materials is done by microorganisms (bacteria).

283 **(c)**
N-acetylglucosamine is found in the inner layer of both bacterial and fungal cell wall and it is commonly known as **chitin.**

284 **(a)**
Thermophiles live in very hot places, typically from 60° to 80°C. many thermophiles (some eubacteria and archaebacteria) are autotrophs and have metabolism of sulphur. Some thermophilic archaebacteria from the basis of food webs around deep-sea thermal vents, where they must withstand extreme temperature and pressures. Archaebacteria can grow in highly acidic (pH=0.7) and very basic (pH=17) environments.

285 **(a)**
In plants mosaic formation, leaf rolling and curling, yellowing and vein clearing are the symptoms of viral diseases

286 **(a)**

Causing Organism	Diseases

Phytophthora infestans	Late blight of potato
Gibberella fujikuroi	Foolish seedling disease of rice
Cercospora personata	Tikka disease of groundnut
Agrobacterium tumefaciens	Crown gall disease of grapes

287 **(b)**
Viruses are acellular, non-cytoplasmic structures and do not have own metabolic system because enzymes are absent. These have DNA or RNA and use host metabalic system.

288 **(d)**
A – Diplontic (gametogenic meiosis and diploid adult)

B – Haplontic (zygotic meiosis and haploid adult)

C – Haplodiplontic (alternation of gametophyte and sporophyte generation, meiosis occur during spore formation).

289 **(b)**
Sporozoan.
Plasmodium is a sporozoan and a causative agent of malarian diseases. It is an endoparasite (present with in the body) and intercullar parasite

290 **(b)**
Plasmodium (Malaria parasite) is digenetic, *i. e.*, completed life cycle on two hosts (man and mosquito).

291 **(d)**
Contractile vacuole is the clear rounded pulsating body present in the posterior part of endoplasm of *Amoeba*. It ais found only in fresh water forms and is mainly concerned with osmoregulation, *i. e.*, removal of excess of water.

292 **(c)**
Archaebacteria is a primitive group of bacteria
The three main groups of archaebacteria are methanogens, halophiles and thermoacidophiles.
Methanogens are found in the musk of swamps and marshes, the rumen of cattle, sewage, sludges and gut of termites
Halophiles are named so because they usually occur in salt rich substrata like salt pans, salt beds and salt marshes
Thermoacidophiles have dual ability to tolerate high temperature as well as high acidity. They often live in hot sulphur springs where the temperature may be as high as 80°C. and pH as low as 2

293 **(a)**
Trypanosome gambiense was first observed by Forde in 1901. Fruce discovered that the parasite of sleeping sickness is transmitted by tse-tse fly. It causes gambian sleeping sickness

294 **(c)**
In mushroom, aggregation of secondary mycelium produces fruiting body called **pileus**.

295 **(c)**

Column I	Column II
Fimbrillin	Pili
Flagellin	Flagella
Teichoic acid	Cell wall
Glycoprotein	S layer

296 **(a)**
Covered smut of barley is caused by *Ustilago hordei*.

297 **(d)**
Many scientists believed that viruses are modified plasmids, which are the fragments of the nucleic acids of the host. These genome fractions escaped and got inducted into new host cells.

298 **(c)**
The plasma membrane of bacteria becomes infolded at some places, theseare known as mesosomes and are considered the sites of respiration.

299 **(d)**
Provirus is the free double stranded DNA structure formed by reverse transcription of retrovirus.

300 **(a)**
Cuscuta is a parasitic plant. It has no chlorophyll and cannot make its own food by photosynthesis. Instead, it grows on other plants using their nutrients for its growth and weakening the host plant

301 **(b)**
The nucleic acid found in a virus can be DNA or RNA Single stranded DNA is found in the bacteriophage $\phi \times 174$, coliphage S13.

302 **(b)**
Mushrooms (*Agaricus* sp) are edible fungus, which belong to class-Basidiomycetes, also called club fungi.

303 **(c)**
Cyanobacteria are Gram (+) photosynthetic prokaryotes, which preforms oxygenic

photosynthesis. Photosynthetic pigments includes chloropyll-*a*, carotenoid and phycobilins. Food is stored in the form of cyanophycean starch, lipid globules and protein graules

304 **(b)**
Protozoans are believed to be the primitive relatives of animals

305 **(c)**
*Pseudomonas*species appears to be most important group of bacteria in denitrification in soils.

306 **(a)**
Plasmodium is a sporozoan and a causative agent of malarian disease. It is an endoparasite (present with in the body) and intercullar parasite

307 **(a)**
Bakanae disease or foolish seedling disease is caused by the fungus
Gibberella fujikuroi (*Fusarium moniliforme*)

308 **(b)**
*Azospirillum*is a nitrogen fixing bacterium for paddy fields. It is very useful soil and root bacterium. It is an associative symbiotic N_2fixing bacteria.

309 **(a)**
*Plasmodium*is a digenetic protozoan, which requires two hosts, *i. e.*, primary (man), definitive or principal host and a secondary (mosquito), intermediate or vector host.

310 **(b)**
In fungi, asexual reproduction occurs through the formation of spores, *e. g.*, zoospores, sporangiospores, chlamydospores, oidia, conidia, etc.

311 **(d)**
Either DNA or RNA.
Bacteriophages is a virus that infects and replicates within bacteria. Bacteriophages are composed of proteins that encapsulate a DNA or RNA genome and may have relatively simple or elaborated structure

312 **(a)**
The fungal mycelium of mycorrhiza in soil plays a highly important role in absorbing and transferring inorganic (mineral) ions, especially phosphorus and nitrogen from the soil to the plant.

313 **(d)**
The fungus *Claviceps purpurea* is responsible for ergot disease of rye, which lowers the yield of rye plant.

314 **(c)**
Flagellated protozoans may be free living, aquatic parasitic, commensals or symbionts

315 **(b)**
Pasteurization is the method of partial sterilization. In older method of milk pasteurization, milk is heated at 63 − 65°C for 30 minutes and in HTST or flash pateurization method, milk is heated at 72°C for at least 15 seconds followed by rapid cooling.

316 **(b)**
Atmosphere contains
N_2 = 78% (most abundant available gas)
O_2 = 21% (second most abundant gas)
Clostridium is an anaerobic bacterium, which does not require O_2 for respiration but it can fix atmospheric nitrogen (most available atmospheric gas)

317 **(a)**
In fungi, the various types of spores are produced in distinct structure called fruiting body

318 **(a)**
*Puccinia*is commonly called rust fungus. Smut is *Ustilago*. Both rust and smut belong to the class-Basidiomycetes.

319 **(b)**
The Russian Biologist **Ivanowsky** (1892)demonstrated the occurrence of microorganisms smaller than bacteria in tobacco leaves suffering from mosaic disease.

320 **(c)**
Agaricales is the order of Basidiomycetes with which most of us are familiar. This is the order that is commonly referred to as mushrooms

321 **(a)**
The common example of class-Basidiomycetes are smut, rusts, mushrooms, tood stools, puff balls birds nest fungi and pore fungi

322 **(b)**
Diatoms are very important photosynthesisers. About half of all the organic matter synthesised in the world is believed to be produced by them. Though microscopic, diatoms are an important source of food to aquatic animals

323 **(b)**
Presence of cell wall is the chief characteristic of plant cell. All bacteria have rigid cell wall.

324 **(a)**
Colletorichum falcatum – Red rot of sugarcane.
Phytophthora infestans – Late blight of potato.
Ustilago nuda –Loose smut of wheat.
Alternaria solani –Early blight of potato.

325 **(c)**
Mycelium.
The body of a fungus (except yeast) is made up of number of elongated, tubular filaments known as hyphae. The mass of network of hyphae is called mycelium

326 **(d)**
Red rot of sugarcane, is caused by the pathogen *Colletotrichum falcatum*; a fungus of class-Deuteromycetes. **White rust of radish** or **white rust of crucifers** is caused by *Albugo candida*or *Cystopus candidus*, which is an algal fungi (Phycomycetes or Oomycetes).

327 **(d)**

Disease	Casual Organism
Citrus canker	*Xanthomonas citri* (bacteria)
Grain smut *Sorghum*	*Sphacelotheca sorghii* (sub-division-Basidiomycotina)
Red rot of sugarcane	*Colletotrichum falcatum*
Black neck or blast	*Pyricularia oryzae* (sub-division-Deuteromycotina)
Disease of rice	

328 **(d)**
Methanogens occurs in marshy areas. Some of the methanogen archaebacteria lives as symbionts inside the rumen or first chamber in the stomach of herbivorous animals that chew their cud (ruminants. e.g., cow, buffalo)
These bacterias are helpful to the ruminants in the fermentation of cellulose

329 **(c)**
The cell wall is composed of two thin overlapping shells, which fit together like a soap case, in diatoms

330 **(a)**
Euglenoids are unicellular flagellate protists. Euglenoids occurs in freshwater habitats. They contains the photosynthetic pigments, chorophyll-*a*, chlorophyll-*b*, β-carotene and xanthophylls

331 **(b)**
Mycorrhizaeis a mutualistic relationship between some soil fungi with the roots of higher plants. The higher plants provide carbohydrate to the fungi and in return the fungi provide to the plants minerals (especially phosphorus), which the plants cannot absorb from soil.

332 **(b)**
Griffith (1928) discovered the phenomenon of transformation, while working on *Diplococcus pneumoniae* for developing a vaccine against it. In transformation, the naked DNA is taken up by a competent bacterial cell from their surrounding medium.

333 **(a)**
Fungi are classified primarily on the basis of particular life cycle involved, *ie*.,**sexual reproduction**. Characteristics of the sexual spores and fruiting bodies are mainly considered.

334 **(c)**
Deuteromycetes are commonly known as imperfect fungi because only the sexual or vegetative phases of these fungi are known

335 **(a)**
The young sporangium of *Rhizopus* contains certain amount of cytoplasm and many nuclei. The sporangium is divided into the denser, peripheral soporiferous zone and the central dome-shaped zone the columella. The protoplast of the columella is continuous with that of sporangiophore. The sporiferous zone undergo cleavage and form haploid sporangiospores.

336 **(d)**
*Mycobacterium leprae*causes leprosy.

337 **(d)**
Viruses and viroids are the non-cellular organisms which are not characterised in the classification of Whittaker

338 **(c)**
They multiply in host cells.
Viruses are so primitive that many scientists consider them to be both living and non-living things. By itself, a virus is a lifeless particle that cannot reproduce. But inside a living cell, a virus becomes an active organism that can multiply hundreds of times

339 **(b)**
Mosaic disease of tobacco was found to be caused by a filterable agent present in the extract of diseased tobacco plant by Ivanowsky (1892). Beijerinck (1896) called it *Contagium vivum fluidum* (living infectious fluid). Stanley (1936)

crystallised Tobacco Mosaic Virus (TMV) for the first time

340 **(c)**
Chemoautotrophs (chemosynthetic) use chemical energy released by biological oxidation of certain inorganic substances for the synthesis of food, *e. g.*, *Nitrosomanas*, *Nitrosococcus* and some other nitrogen cycle bacteria.

341 **(a)**
Saccharomyces cerevisiae (yeast) is commonly known as baker's yeast or brewer's yeast because it is widely used in baking and brewing industries.

342 **(d)**
The *Alternaria* sp. are imperfect filamentous fungi belonging to the class-Deuteromycetes

343 **(b)**
Contractile vacuoles are osmoregulatory organs in *Amoeba* for the elimination of excess water from the body and excretory by-product, *i. e.*, ammonia.

344 **(b)**
*Rhizobium leguminosarum*is a small, flagellate Gram negative, aerobic, rod-shaped bacteria. It persists saprophytically in the soil until it infects a root hair or damaged epidermal cell. After infection, *Rhizobium* establishes a symbiotic relationship with legumes living inside the root nodules and fixes large amount of nitrogen, much of which is made available to the plant.

345 **(a)**
Ustilago and *Puccinia* are the common parasites of Basidiomycetes.
Puccinia graminis tritici belongs to class-Basidiomycetes. It causes black rust of wheat.
Ustilago is an economically important member as it causes destructive smut diseases in most of the cereal plants

346 **(b)**
The class-Basidiomycetes includes those members that produce their basidia and basidiospores on or in a basidiocarp. In Basidiomycetes, the mycelium is branched and septate

347 **(c)**
Virus is made up of RNA or DNA and protein, *i. e.*, nucleoproteins. They are obligate parasites,*i. e.*, virus multiplies only in living cells or body of organism, *e. g.*, Retrovirus.

348 **(a)**
Heteroecious fungus completes its life cycle on two hosts.

349 **(b)**
Bacteriophage is a virus which infects bacteria.

350 **(c)**
Penicillin acts on cell wall and mycoplasma lacks cell wall.

351 **(d)**
Plasmids are small, circular extragenomic DNA segments found in bacteria and yeast. It was discovered by **Lederberg** in the year 1952.

352 **(b)**
Viroids are extremely simple infectious agents consisting of only very small RNA genomes, discovered in 1967 by **Diener** and **Raymer**.

353 **(b)**
Kingdom-Protista includes a wide variety of unicellular organisms, mostly aquatic eukaryotes. There are believed to be evolved from prokaryotic monerans and are the precursors from, which higher organisms are evolved

354 **(a)**
Protista includes unicellular eukaryotes.

355 **(b)**
The infective stage of *Plasmodium* to man is sporozoite. The sporozoites are small, spindle-shaped, slightly curved and uninucleate organisms. *Anopheles*contains the infective stage in its salivary glands. These are transmitted during the blood meal feeding of a *Anopheles* mosquito on a human.

356 **(b)**
The tobacco mosaic virus is long, slender and rod-shaped. It is a complex structure made up of nucleoprotein (the protein and nucleic acid). The central core of ribonucleic acid is surrounded by virus protein

357 **(a)**
HIV is enveloped within a membrane, which is made up of several Gp-120 and Gp-41 glycoprotein. Both of these glycoproteins resemble spiked 'dots',which give the HIV the look of a horse chestnut. The central part called core of HIV contains two single strands of RNA.

358 **(b)**
The organisms involved in nitrogen fixing are called **nitrogen fixing organisms.**Generally, these are bacteria or cyanobacteria (blue-green algae). *Rhizobium* and *Frankia* are the symbiotic nitrogen fixing bacteria.

359 **(c)**
In mushroom, gills are concerned with reproduction. The edges of the gills are made up of a fertile layer, the hymenium. The hymenium consists of club-shaped basidia, which bear basidiospores.

360 **(c)**
Leuko virus contains both DNA and RNA.

361 **(c)**
Bacteria shows both autotrophic and heterotrophic nutrition. Autotrophic nutrition involves manufacturing of organic materials from inorganic raw materials with the help of energy obtained from outside. It is of two types, chemosynthesis and photosynthesis. The bacteria performing these modes of nutrition are respectively called chemoautotrophs and photoautotrophs. The vast majority of bacteria are heterotrophs, *i.e.*, they do not synthesise their own food but depends on other organism or on dead organic matter for food

362 **(c)**
There are two major group of monerans, archaebacteria and eubacteria. Some other groups of monerans are mycoplasma, rickettsiae and actinomycetes. Mycoplasmas or mollicutes are the simplest and smallest free living prokaryotes

363 **(c)**
Mesosomes are folding of plasma membrane inside cytoplasm in certain bacteria. They have enzymes, which are useful for respiration. Mitochondria and other membrane bound organelles are absent in bacteria.

364 **(b)**
Some species of bacteria reproduce sexually with the help of endospores. Endospores are thick walled spores formed singly in a bacterial cell. These are commonly seen in the species of *Bacillus* and *Clostridium*.

365 **(c)**
Denitrifying bacteria likePseudomonas denitrificans, Thiobacillus denitrificans utilize nitrates and other oxidized ion as source of oxygen. They undergo denitrification, in which nitrates are reduced to gaseous compounds of nitrogen and depletion of an important nutrient occurs from the soil.

366 **(b)**
N_2- fixing organisms (eubacteria/cyanobacteria) as well as Archea are prokaryotes, hence classified among **Monera** of five kingdom concept proposed by Whittaker.

367 **(a)**
Lichens are extremely sensitive to pollutants in the atmosphere and thus they can be used as bio-indicators of air quality. Their sensitivity results from their ability to absorb substances dissolved in rain and dew.

368 **(a)**
The nucleic acid of virus is surrounded by a protein shell called capsid

369 **(a)**
Streptomycin is obtained from *Streptomyces griseus*
Auromycin (tetracyclin) is obtained from *Streptomyces aureofaciens*.
Chloromycetin is obtained from *Streptomyces venezuelae*.
Terramycin is obtained from *Streptomyces ramosus*

370 **(a)**
Nostoc and *Anabaena*
Cyanobacteria have chlorophyll-*a*, similar to green plants and are photosynthetic autotrophs. Some of these organisms can fix atmospheric nitrogen in toe specialized cells called heterocysts, *e. g.*, *Nostoc* and *Anabaena*

371 **(d)**
A five kingdom division oforganisms was proposed by **Whittaker**. Protista is one of that division. It is a kingdom of unicellular, eukaryotic organisms. Many of them are photosynthetic autotrophs, unicellular algae and diatoms. Some protists are heterotrophic, *e. g.*, Protozoa.

372 **(a)**
TMV is elongated rod-like, 3000Å (300 nm) long and 180Å (18nm) in diameter.

373 **(d)**
Lichen is a symbiotic relationship between algae (phycobiont) and fungi (mycobiont). Both the partners are in a constant physical contact and have almost equal physiological interdependence. The fungal partner takes part in reproduction, and protection while algae synthesize food through photosynthesis.

374 **(d)**
*Azotobacter*and *Beijerinickia* are aerobic free living, saprotrophic (heterotrophic), nitrogen fixing bacteria. *Azotobacter*sp (aerobic) are the main nitrogen fixing free living bacteria.

375 **(a)**
Crown gall disease in plants is caused by Ti-plasmid (Tumour inducing plasmid).

376 **(d)**
Aspergillus, *Penicillium* and *Fusarium* are quite common fungi infesting food and food stuffs and secrete toxins.

377 **(c)**
I and II are true.
The siliceous cell walls of diatoms are indestructible (i.e., do not decay easily). They were collected over millions of years on the sea floors, called diatomite or diatomaceous earth or silica gel. These deposits may extends for several hundred metres in certain areas

378 **(a)**
Plasmogamy is the first stage of sexual reproduction in which the cytoplasms of two sex cells fuse with each other

379 **(d)**
Glomus is a genus of arbuscular mycorrhizal (AM) fungi. It helps in nutrient uptake mainly the absorption of phosphorus.

380 **(d)**
Diatomite or diatomaceous earth is used as a cleaning agent in tooth pastes, metal polishes, filtration of oil and syrups, added to paints for enhancing night visibility, to make sound proof rooms, as insulating material in refrigerators and furnaces and employed as a source of water glass or sodium silicate

381 **(a)**
Conidium is asexual spore of certain fungi, cut off externally at the apex of specialized hyphae (conidiophore), while sporangiophores produced inside the sporangium.

382 **(a)**
Athlete's food is a fungal disease, kala-azar is a protozoan disease, typhus fever is a rickettsial disease and chicken pox is a viral disease.

383 **(a)**
A free living thalloid body of the acellular slime moulds is called *Plasmodium*. The *Plasmodium* is wall less mass of multinucleate protoplasm, covered by slime

384 **(a)**
Retroviruses are so named because they contain enzyme reverse transcriptase or RNA dependent DNA polymerase. The genetic material of these viruses is RNA, *e. g.*, Rous sarcoma virus.

385 **(a)**
Chrysophytes are microscopic and float passively in water current (Plankton). Chrysophytes (diatoms) constitutes an important producer in the form of phytoplanktons in aquatic ecosystem. They are the main source of food to aquatic animals

386 **(b)**
Pheromone is a substance secreted to outside by an individual and received by a second individual of the same species in which it induces a specific reaction, *e. g.*, fusion of two yeast cells during sexual reproduction.

387 **(a)**
Contractile vacuoles are required foe osmoregulation, *i. e.*, maintenance of water balance within the body. These are found in the cytoplasm of those organisms, which live in hypotonic water. *Amoeba* is a good example of such type of organisms. *Entamoeba*, an endoparasite, lives in the large intestine where the surrounding is isotonic. The osmotic concentration of its body protoplasm equals to that of the intestinal fluid of the host and hence no water enters the parasite by osmosis. So, this organism does not require contractile vacuoles.

388 **(a)**
Kingdom-Protista includes all unicellular eukaryotic organisms.

389 **(b)**
Plasmid is an extrachromosomal genetic element present in bacterial cells and consists of DNA that can exist and replicate independently of the chromosome. Plasmids are widely used as vectors to produce recombinant DNA for gene cloning.

390 **(d)**
In Phycomycetes, zoospores are formed by the fusion of two gametes. These gametes are similar (isogamous) or dissimilar (anisogamous or oogamous) in morphology

391 **(c)**
Like cyanobacteria algae, autotrophic plants and photoautotrophic, bacteria also use light energy for reducing CO_2 to organic compounds but water is never used as a source of electrons in bacteria. Hence, oxygen is never evolved during bacterial photosynthesis.

392 **(a)**

Fungi absorbs soluble organic matter from dead substrates are called saprophytes

393 **(a)**
*Rhizobium leguminosarum*is a nitrogen fixing bacterium found symbiotically within the root nodules of leguminous plants. In *Rhizobium*, ***Nif*** **genes**are present, which are responsible for the synthesis of enzymes nitrogenous and has the capability of fixing atmospheric nitrogen.

394 **(d)**
Anabaena is a free-living nitrogen fixing cyanobacterium which can form symbiotic association with water fern*Azolla*

395 **(c)**
N-acetylglucosamine is found at the inner layer of bacterial and fungal cell wall and it is commonly known as chitin.

396 **(d)**
Deuteromycetes are saprotrophs in soil and on decaying organic matter. Most of them become parasites and cause serious diseases in plants, animals and human beings. A large number of Deuteromycetes are decomposers of litter and help in mineral cycling. Some common examples of Deuteromycetes are; *Alternaria, Colletotricum, Fusarium, Trichoderma, Cercospora*, etc

397 **(a)**
Basidiomycota comprises the most morphologically complex group of macrofungi. They include mushrooms and toad stools and rust and smut parasites of plants

398 **(d)**
The fungal partner protects the alga by retaining water, serving as a larger capture area for mineral nutrients and, in some cases, provides minerals obtained from the substrate

399 **(b)**
Fungus of mycorrhiza helps in solubilization of phosphate. *Bacillus thuringiensis*has*cry* gene responsible for synthesis of cry protein.

400 **(d)**
Bacteria are prokaryotic in nature, in which typical chromosomes are lacking. DNA is circular and naked as it is not surrounded by histones (basic proteins).

401 **(d)**
The morphology of the mycelium, mode of spore formation and fruiting forms, *the basis for the division of the kingdom into four classes*
(i) Phycomycetes (ii) Ascomycetes (iii) Basidiomycetes (iv) Deuteromycetes

402 **(a)**
Prions have a distinct extracellular form but the extracellular form is entirely protein. The prion particle does not contain any nucleic acid. However, it is infectious and prions are known to cause a variety of diseases in animals.

403 **(c)**
Asexual reproduction takes place through zoospores, which are motile or through non-motile aplanospores

404 **(a)**
Inspection of domain Archaea shows that two sub-divisions exist; the Euryarchaeota and the Crenarchaeota. The Euryarchaeota includes *Methanobacterium*, *Methanococcus*, *Thermococcus*.

405 **(a)**
Penicillin was the first known antibiotic or an antimicrobial agent produced by *Penicillium notatum* and discovered by A Fleming (1929).

406 **(a)**
If the plane of cytoplasmic division coincides with the transverse axis of the individual, then the fission is called **transverse binary fission**, *e. g.*, *Paramecium*, *Planaria*.

407 **(b)**
The credit for the discovery of virus goes to **D J Ivanowski** (1892), a Russian botanist, who prepared an extract of tobacco mosaic diseased plant which when passed through bacteria filter, filtrate was still infectious. **Wendell Stanley** (1933) purified TMV in crystal form.

408 **(c)**
VAM (Vesicular Arbuscular Mycorrhizae) is the mutually beneficial or symbiotic association of a fungus with the root of a higher plant is known as **mycorrhiza.**

409 **(d)**
Zygophores are the special branches develop from the somatic hyphae. Each zygophore bears **progametangium** and terminal protein of progametangium is called **gametangium**. Protoplasts of two opposite strained gametangia become fuse and form diploid mass called **zygospore**.

410 **(b)**

The plant cell have an eukaryotic structure with prominent chloroplast. Chloroplast contains chlorophyll which is responsible for the plant's green colour and imparts the ability to absorb energy from sunlight. This energy is used to convert water plus atmospheric carbon dioxide into metabolisable sugars by the biochemical process of photosynthesis.
Kingdom includes algae, bryophytes, pteridophytes, gymnosperms and angiosperms. Life cycle consists of alternating haploid gametophyte and diploid sporophyte generations

411 **(b)**
The mycelium of *Albugo* is intercellular, branched, aseptate, eucarpic and multinucleate (coenocytic).

412 **(d)**
*Amoeba*has only one contractile vacuole. This vacuole regularly pumps out excess water like human kidney.

413 **(d)**
Bacteria are the most abundant microorganisms. A handful of soil may contain hundreds and thousands of them

414 **(d)**
The transfer of bacterial genes from one bacterium to another through virus is called **transduction**. This process cannot take in the absence of virus.

415 **(c)**
Parasexual cycle was first discovered by **Pontecarvo** and **Roper** in 1952 in *Aspergillus nidulans*. It is also known as somatic recombination.

416 **(a)**
Viroids were first studied in potato spindle tuber disease. Viroids have no protein coat and contain circular RNA only.

417 **(c)**
Mycoplasmas are the simplest and the smallest of the free living prokaryotes. Due to the absence of cell wall, the organisms can change their shape and are pleomorphic. They can survive without oxygen. Many mycoplasma are pathogenic in animals and plants. They mostly produce pleuropneumonia in domestic animals, a typical pneumonia and mycoplasmal urethritis in humans, little leaf disease of brinjal and witches broom in plants

418 **(c)**
Slime mould do not belong to kingdom-Monera. These belong to kingdom-Fungi and division-Myxomycota.

419 **(c)**
'Aspergillosis' is a lung disease in human beings caused by a fungus *Aspergillus*.

420 **(d)**
Pasteurization involves the treatment of milk to destroy disease causing organisms. Milk is heated to 65°C for 30 minutes or to 72°C for 15 seconds followed by rapid cooling to below 10°C in pasteurization.

421 **(a)**
AIDS is a disease of the human immune system which is caused by an infection with Human Immune deficiency Virus (HIV)

422 **(a)**
Cell wall of all fungi contains chitin of fungal cellulose along with other polysaccharids, proteins, lipids and a number of the substance

423 **(c)**
The causal agent of two human diseases called kuru disease and Creutzfeldt-Jacob disease and that of sheep called scrapie disease, is the 'Prion'. It was first reported by **Pruisner** (1982). It is an infectious proteinaceous particle.

424 **(c)**
Both (a) and (b).
Methanogens occurs in marshy areas. Some of the methanogen archaebacteria live as symbionts inside the ruman or first chamber in the stomach of herbivorous animals that chew their cud (ruminants. e.g., cow, buffalo)
These bacterias are helpful to the ruminants in the fermentation of cellulose

425 **(a)**
In human, virus causes various disease like AIDS (HIV Virus), mumps (paramyxovirus), smallpox (variola virus). Herpes (HSVI) and influenza (RNA viruses of the family-Orthomyxoviridae). Diabetes and cholera are not the viral diseases

426 **(d)**
Cyanobacteria may be unicellular, colonial or filamentous. Each filament consists of a sheath of mucilage and one or more cellular strands called trichomes

427 **(a)**
National Institute of Virology is situated at Pune.

428 **(c)**

Chrysophytes include diatoms and desmids (golden algae). They belong to the division-Chrysophyta/Bacillariophyta

429 **(b)**
Mycorrhiza is the symbiotic association between fungus and root of higher plants. The mycorrhizal roots are usually covered with fungal wooly outgrowth. Fungus growth does not cause any harm to the plant. Along with water phosphones and nitrogen are also absorbed.

430 **(a)**
Traditionally, all the organisms of the world used to be divided into two kingdoms, *i.e.,* plant kingdom and animal kingdom. This system was given by Carolus Linnaeus in the book *Systema Naturae* (1735)

431 **(c)**
Plasmodium is a free-living multinucleate amoeboid mass of protoplasm. It is found in acellular slime moulds.
Pseudoplasmodium is an aggregated mass of amoeboid cells where each cell maintains its separate identify.
Pseudoplasmodium is found in cellular slime moulds

432 **(b)**
Continued nuclear division makes the hyphae multinucleate. It the whole mycelium is without septum, the same is called coenocytic

433 **(c)**
Parasexuality is related with protoplast fusion and found in fungus.

434 **(d)**
Members of class-Oomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants. Thallus is mycelial. The hypae are coenocytic (*i.e.*, aseptate and multinucleate). Asexual reproduction occurs by the formation of spores produced inside the sac-like sporangia. Terrestrial species produces aplanospores and aquatic species produces zoospores

435 **(c)**
In chrysophytes the cell walls form two thin overlapping shells, which fit together as in a soap box. The walls are embedded with silica and thus, the walls are indestructible.

436 **(c)**
Transformation is a process by which free DNA is incorporated into a recipient bacterial cell and brings about genetic change. During the process of transformation, genes are transferred from one bacterium to another as 'naked DNA' in solution. The first evidence of bacterial transformation was obtained by the British scientist **Fredrick Griffith** in the late 1920s while working on *Streptococcus pneumoniae* (*Pneumococcus*). Hence, transformation is also referred to as 'Griffith effect'.

437 **(d)**
Viroids are small, circular, single-stranded RNA molecules that are the smallest known pathogens. A few well studied viroids include coconut cadang-cadang viroid, citrus exocortis viroid and potato spindle tuber viroid.

438 **(b)**
Viruses are noncellular obligate parasites. In the free state, they are just like the particles. They do not have their own metabolic machinery. They use host's machinery for multiplication.

439 **(a)**
Keratophilous fungi are responsible for hair loss.

440 **(b)**
The plant body of the *Rhizopus* is mycelium which is eucarpic. The mycelium is distinguishable into three types of hyphae namely rhizoidal hyphae, stolons and sporangiophores. The mycelium is aspetate, branched and multinucleate (coenocytic).

441 **(c)**
Class-Deuteromycetes This class of artificially grouped fungi have no sexual reproduction and are consequently called the fungi imperfecti because their life cycles are imperfect

442 **(b)**
Retrovirus is the RNA virus that infects animal cells and replicates by first being converted to double stranded DNA, with the enzyme reverse transcriptase.

443 **(c)**
Bacteriophages are viruses that kill bacteria. Bacteriophages are much smaller the bacteria they destroy.

444 **(b)**
Conidia are the means of asexual reproduction in fungi. In some fungi, the spores are not formed inside a sporangium. They are born freely on the tips of special branches called conidiophores. The spores thus formed are called conidia. On the basis of development, two types of conidia are

recognized, *i. e.*, thallospores and blastospores or true conidia.

445 **(a)**
Mutualism is a type of association, where both the partners are benefitted. **Lichens** show a permanent and obligatory associations between algae and fungi involving physiological interdependence.

446 **(b)**
Ringworm refers to fungal infections that is on the surface of the skin. Although the world is full of yeasts, moulds and fungi, only a few cause skin problems. These agents are called the dermatophytes. Some common dermatophytic fungi are Trichophyton rubrum, T.tonsucans, T. interdigitale, T.mentagrophytes, Microsporum canis and Epidermophyton floccosum.

447 **(d)**
Insectivorous plants can capture and digest live prey, to obtain nitrogen compounds that are lacking in its usual marshy habitat, *e. g.*, bladder wort, venus fly trap, *Nepenthes*

448 **(d)**
All of the above.
RH Whittaker divided living organisms into five kingdoms based on their cell structures, body structure, nutrition, reproduction and phylogenetic relationships. *The five kingdom as given by Whittakaer are*
(i) Monera (ii) Protista (iii) Fungi (iv) Plantae (v) Animalia

449 **(b)**
Cyanobacteria have chlorophyll-*a*, similar to green plants and are photosynthetic autotrophs. Some of these organisms can fix atmospheric nitrogen in to specialised cells called heterocysts, *e. g.*, *Nostoc* and *Anabaena*

450 **(a)**
Eubacteria is also called true bacteria. They are characterised by the presence of a rigid cell wall and if motile, a flagellum

451 **(c)**
Basidiospores are produced by the members of class-Basidiomycetes, *e. g.*, *Agaricus*, toadstools and bracket fungi.

452 **(d)**
Fusion of protoplasms → Fusion of two nuclei → Meiosis
The sexual reproduction in fungi completes in three phases
(i) Plasmogamy (ii) Karyogamy (iii) Meiosis
Fusion of protoplasms between two motile or non-motile gametes is called plasmogamy
3. Fusion of two nuclei is called karyogamy
4. Meiosis in zygote results in the formation of haploid spores

453 **(c)**
Nitrogen fixing cyanobacteria are often used for reclaiming USAR soils, *e. g.*, *Nostoc*, *Anabaena*. These cyanobacteria produce acidic chemicals for counteracting alkalinity of the soil and nitrogenous compounds, which are generally deficient in these soils

454 **(a)**
Cyanobacteria or blue-green algae are Gram (+) photosynthetic prokaryotes, which performs oxygenic photosynthesis

455 **(a)**
TMV is a single stranded RNA molecule containing plant virus. It is an elongated rod like 3000Å (300 nm) long and 180Å (18 nm) in diameter.

456 **(d)**
Heterocysts are specialized cells responsible for nitrogen fixation in certain cyanobacteria.

457 **(a)**
Fungal cell wall contains 80-90% carbohydrates, the remainder being proteins and lipids. The typical feature of fungal cell wall is presence of chitin but cellulose does occur in cell walls of Oomycetes (*e. g.*, *Pythium*) and Hyphochytridiomycetes.

458 **(a)**
*Claviceps*is a member of class-Ascomycetes. The Ascomycetes have a multicellular mycelium (except yeast) with septal pore and chitinous wall. The sexual reproduction produces dikaryophase $(n + n)$. Other examples are: *Saccharomyces*, *Penicillium*, *Aspergillus*, *Neurospora*, *Morchella*, etc

459 **(a)**
Mycorrhiza is an association between a fungus and the root of a higher plant, *e. g.*, *Eucalyptus*, pine, etc. It is found in oligotrophic soil.

460 **(d)**
*Trypanosoma*is the parasitic, zooflagellate protozoan. It is an endoparasite, blood parasite, extracellular parasite.

461 **(c)**
*Dialister pneumosintes*is the smallest bacterium, *i. e.*, 0.15 – 0.3μ long.

462 **(a)**
Due to resemblance with slipper of shoe, the *Paramecium* (a protozoan) is known as slipper animalcule.

463 **(a)**
Female *Anopheles* mosquitoesare blood suckers of vertebrates. These have long proboscis and palpi of equal length.

464 **(c)**
Antibiotics are the substances that destroy or inhibit the growth of microorganisms particularly disease producing bacteria and fungi. They are obtained from microorganisms. *Streptomyces*is the largest genus of actinobacteria (Streptomycetaceae). They produce over two-thirds of the clinically useful antibiotics of natural origin, *e. g.*, neomycin, chloramphenicol.

465 **(b)**
In 1969, American biologist, Robert H Whittaker proposed five kingdom classification. The main criteria for classification used by him include cell structure, thallus organization, mode of nutrition and reproduction.

466 **(c)**
Some dinoflagellates, such as *Gymnodinium* and *Gonyaulax* grows in large number in the seas and make the water look red and causes the red tides

467 **(c)**
The **phenolic compounds** secreted by the plants in response to fungal reaction are called **phytoalexins**.

468 **(d)**
Mesosomes are extensions of the plasma membrane within the bacterial cell (cytoplasm), involving complex whorls of convoluted membranes.

469 **(d)**
Paramecium are aquatic, actively moving organism because of the presence of cilia. *Paramecium* have a cavity (gullet) that opens to the outside of the cell surface. The coordinated movement of rows of cilia causes the water laden with food to be steared into the cavity (gullet)

471 **(d)**
'Club Fungi' is the common name given to the fungi of class-Basidiomycetes because of club-shaped end of mycelium knows as basidium.

472 **(d)**
Yeast is a facultative aerobe. When yeast is grown in a well aerated (Aerobic) nutrient medium, the sugar is completely oxidized in normal respiration.

$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O + \text{Energy}$

But in anaerobic condition, sugar is converted into carbon dioxide and ethyl alcohol (C_2H_5OH) within the cytoplasm.

$$\underset{\text{Glucose}}{C_6H_{12}O_6} + \text{Yeast} \rightarrow 2\underset{\text{Ethyl alcohol}}{C_2H_5OH} + CO_2 + \text{Energy}$$

473 **(c)**
Viruses that infect bacteria, multiply and cause their lysis are called lytic.

474 **(b)**
Single Cell Proteins (SCP) are the proteins produced by microorganisms (bacteria, unicellular alga, yeast, etc) that are extracted for use as a component of human or animal food. The fungi used for the commercial production of SCP are *Saccharomyces* (yeast), *Fusarium graminearum*, etc.

475 **(a)**
In *Varticella*, in macroconjugant, micronucleus undergoes two divisions forming 4 nuclei (or micronuclei), 3 of which disintegrate and the remaining one becomes the female pronucleus.

476 **(d)**
Animals are heterotrophic, eukaryotic, multicellular organism. Animal cells do not have cell walls. Nutrition is typically holotrophic. Digestion occurs within specialised cavities

477 **(d)**
Phylogenetically the kingdom-Protista acts as a connecting link between the prokaryotic kingdom-Monera on one hand and the complex multicellular kingdoms-Fungi, Plantae and Animalia on the other hand. Protists reproduce asexually and sexually by a process involving cell fusion and zygote formation. Eukaryotes means true nucleus bearing organisms

478 **(a)**
Cyanobacteria are prokaryotic blue-green algae belonging to the class-Cyanophyceae or Myxophyceae. These contain chlorophyll-*a*, carotenoids and three phycobiliproteins (blue-green pigments) *c*-phycocyanin, allophycocyanin and *c*-phycoerythrin.

479 **(d)**
Sporozoites are the infective stage of malarial parasite. They are present in the saliva of infected female *Anopheles* mosquito. This infective stage is directly goes to parenchyma cells of liver.

480 **(c)**
During unfavorable conditions, *Amoeba* reproduces by encystment and multiplefission.

481 **(d)**
Witches broom is a disease of cherries caused by *Taphrina cerasi*, a member of fungal class-Ascomycetes.

482 **(a)**
Deuteromycetes reproduce only by asexual spores known as conidia. Most of the 17,000 species reproduce by conidia. Conidia are non-motile fungal mitospores which are produced exogenously from the tips and sides of the hyphae called conidiophores

483 **(d)**
A lichen is structurally organised entity consisting of the permanent association of a fungus and an alga. Algae prepare food for fungi. Fungi provides shelter and absorbs water and minerals for algal partner. Lichens are very sensitive to air pollution, particularly to SO_2 concentration in the atmosphere. They die at higher levels of SO_2

484 **(a)**
Mycorrhiza is a symbiotic relationship between fungi and roots of higher plants.

485 **(d)**
Murein or **mucopeptide** or **peptidoglycan** is found in the bacterial cell wall including eubacteria and cyanobacteria. Diatoms are algae and lack murein in cell wall.

486 **(a)**
Cyanobacteria produces water blooms, imparting bad odour and colour to water bodies

487 **(b)**
White spots seen on mustard leaves are due to a parasitic fungus *Albugo*

488 **(b)**
Some dinoflagellates (*e.g.*, *Gonyaulax* catenella) are poisonous to vertebrates. When they are in large number, they produce the toxin called saxitoxin into the sea water, which kills fishes and other marine animals

489 **(b)**
*Trypanosoma cruzi*is the digenetic parasite *i.e.*, its life cycle is completed into two hosts. The primary host is man, cat, dog or monkey and secondary or intermediate host of this parasite is *Triatoma infestans*.

490 **(a)**
Members of Phycomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants

491 **(a)**
A virus consist of:
Core: Genetic material either DNA or RNA.
Capsid: A protective coat of protein surrounding the core.
Nucleocapsid: Combined structure formed by the core and capsid.
Capsomeres: Capsids are often built up of identical repeating sub-units called capsomeres.

492 **(a)**
*Plasmodium*is a causative agent of malaria disease. It is an **endoparasite** (present within the body) and interacellular parasite.

493 **(a)**
Dr. Ronald Ross (20th August, 1897) discovered the oocyte of parasite on the outside of midgut or stomach of female *Anopheles* and found out that the malaria is transmitted by the bite of mosquitoes. For this discovery, he was awarded **Nobel Prize** in 1902.

494 **(b)**
Mucor (dung mould) and *Rhizopus* (black bread mould) are included in class-Phycomycetes. Both are the common saprotrophic fungi, that attack a variety of food stuffs

495 **(b)**
Bacteria are grouped under four categories based on their shape. The spherical coccus, the rod-shaped bacillus, the comma-shaped vibrium and the spiral spirillum

496 **(b)**
Plasmogamy is the fusion of two haploid cells without nuclear fission

498 **(c)**
Diatoms and desmids are found in freshwater as well as in marine environments. They are microscopic and float passively in water currents

499 **(b)**
The motile zygote formed by fertilization (anisogamy) of macrogamete by a microgamete is called ookinete.

500 **(b)**
*Phytophthora infestans*causes late blight disease of potato. The disease is widely spread in the hilly areas of India during rainy season. Low temperature and humid atmosphere favor the spread of the disease.

501 **(c)**
The most characteristic feature of *Paramecium* is the presence of a large number of cilia on the whole body surface. *Paramecium* uses cilia for locomotion and capturing food

502 **(c)**
Prophage is the DNA of a bacteriophage that is repressed for lytic functions and that is maintained in the host bacterium in a stable state. The phage genome may be integrated into the DNA of its bacterial host and may be replicated along with the host DNA, as is the case for bacteriophage lambda or may be maintained as extrachromoromal-DNA, as in the case for bacteriophage P_1.

503 **(d)**
Some viruses have a lipid bilayer membrane around them, *i. e.*, enveloped viruses, while the other viruses are naked. During penetration within a host, fusion with the host membrane is preferred and endocytosis is preferred by naked viruses.

504 **(d)**
The mode of nutrition in *Amoeba* is holozoic and involves the following processes:
(a) Phagocytosis, *i. e.*, intake of food in solid form.
(b) Pinocytosis, *i. e.*, intake of food in liquid or solution form.
(c) Exocytosis, *i. e.*, egestion of residual undigested food.
Figure in the question shows all the three process stated above.

505 **(a)**
Haemozoin is an undigested part of blood (RBCs break down into haematin and protein, protein is digested by *Plasmodium* and haematin is modified into haemozoin pigment) in trophozoite of *Plasmodium*. Haemozoin is toxic material pigment, which causes chill, body pain and fever.

506 **(b)**
Euglena is found in fresh and stagnant water

507 **(c)**
R H Whittaker (1969) classified living organisms into five kingdoms based on cell structure, body organization, nutrition and life style. The five kingdoms are Monera, Protista, Fungi, Plantae and Animalia.

508 **(b)**
The bacteria *Pseudomonas* is useful because of its ability to decompose a variety of organic compounds. **Prof. Anand Mohan Chakraworty** (an Indian born Molecular Biologist) developed a super strain of *Pseudomonas*, which can degrade oil. It is known as Chakraworty's superbug.

509 **(b)**
Karyogamy is the fusion of two compatible nuclei brought together as a result of plasmogamy

510 **(a)**
Facultative autotrophs are basically heterotrophs, which also have chlorophyll and make food through photosynthesis.

511 **(d)**
Members of Basidiomycetes are grown in soil, on logs, on tree stumps and in living plant bodies

512 **(c)**
Plasmid is an extrachromosomal, closed circular DNA molecule existing only in the cytoplasm of bacteria.

513 **(c)**
Basidiocarp or **sporocarp** is a fruiting body of the members of fungal family-Agaricaceae. Members of Agaricaceae are filamentous and heterotrophic, *i. e.*, cannot prepare food for their own.

514 **(b)**
Phycomycetes is a class of kingdom-Fungi.

515 **(a)**
Prophage is the non-infectious phage DNA, which is integrated into a bacterial chromosome and multiplying with the dividing bacterium.

516 **(c)**
Slime moulds are protists, *i. e.*, unicellular eukaryotic organisms. They are characterized by:
(i) Absence of chlorophyll so, mode of nutrition is heterotrophic.
(ii) Naked myxamoebae, Plasmodium or pseudoplasmodium
(iii) Capillitium.

517 **(c)**
Spirochaetes are slender, flexuous and helically coiled bacteria verying in length from 3-500μm. Some of them are saprophytes and the other are parasites. The spirochaete *Treponema pallidum* causes syphilis disease.

518 **(c)**
AIDS (Acquired Immuno Deficiency Syndrome) is caused by HIV (Human Immunodeficiency Virus). HIV contains single stranded RNA (two copies) as genetic material and reverse transcriptase enzyme.

519 **(b)**

Myxomycetes are known as cellular slime moulds, they grow in damp places, *e. g.*, soil and rotting trees trunk. Myxomycetes are slimy mass of the multinucleated protoplasm that has pseudopodia like structure for engulfing foods. Reproduction in them takes place through fragmentation or zoospores.

520 **(b)**
Sol-gel theory was first proposed by **Hyman** (1917). Later it was supported by **Pantin** and **Mast**. According to this theory, the pseudopodia are formed by change of cytoplasm from gel to sol and sol to gel.

521 **(b)**
AIDA is caused due to infection of Human Immunodeficiency Virus (HIV). AIDS is characterized by reduction in the number of CD^4 of helper T_4 –lymphocytes, as HIV kills these cells.

522 **(a)**
Two French scientist **Jacob** and **Monod** (1961) proposed operon model for gene regulation in prokaryotes.

523 **(c)**
Binary fission is the common method of bacterial multiplication under favourable conditions.
Bacteria produces several types of spores called gonidia, sporangiophores, arthrospores, canidia, cysts and endospores.
Bacteria also reproduce by a sort of sexual reproduction by adopting a primitive type of DNA transfer from one bacterium to the other

524 **(a)**
*Amoeba*is an unicellular, microscopic organism measuring 250 – 500µ. It is a free living protozoan found in ponds, drains ditches and springs, etc.

525 **(d)**
Amoeboid protozoans lives in freshwater, sea water moist soil, They move and capture their prey by putting out pseudopodia. Marine amoeboid protozoans have silica shells on their surface

526 **(c)**
Bacteria are the omnipresent, heterotrophic sometimes parasitic saprophytic, symbiotic or autotrophic unicellular, generally colourless and morphologically least complex prokaryotes. These are bound by rigid cell wall of mucopeptide.

527 **(b)**
During bacterial staining (Gram staining), Gram positive bacteria stained purple, while Gram negative stained red or pink.

528 **(c)**
Encysted, non-feeding and non-motile infectious stage of *Entamoeba*
is called minuta form.

529 **(b)**
Viroid was discovered by TO Diener in 1971 as a new infectious agent that was smaller than viruses. Viroids lacks capsid and have not proteins associated with them. The nucleic acid that they infects is a free RNA with low molecular weight. They have been identified as causes responsible for some very important plant diseases such as, potato spindle tuber, chrysanthemum stunt

530 **(c)**
All are correct except III. In Ascomycetes, the mycelium is well developed and branched. The hyphae are septate and multicellular

531 **(b)**
At the time of formation of pseudopodia in anterior part of *Amoeba*, plasma sol is converted into plasma gel.

532 **(d)**
In fungi, vegetative reproduction occurs by fragmentation, budding, fission, sclerotia and rhizomophs

533 **(c)**
Heterotrophic bacteria are the most abundant in nature. The majority are important decomposers. Many of them have a significant impact on human affairs

534 **(d)**
An American taxonomist, **Robert H Whittaker** has proposed a five kingdom classification of living organisms in the year **1969.**

535 **(d)**
Envelopes of animal virus usually arise from host cells nuclear or plasma membrane. Viruses do not have ribosomes. Proteins of envelope and capsid however, coded by viral genes.

536 **(a)**
In the new host, after 5-6 hours, cyst wall is digested releasing the tetranucleate *Amoeba* called excystic *Amoeba* or metacyst.

537 **(c)**

Protein coat is present in virus but absent in viroids. Viroids are the infectious agents which have naked nucleic acid (mainly RNA)

538 **(b)**
The members of **Myxomycetes** are called **slime moulds** because they contain and secrete slime. They are included in lower fungi. Their somatic phase is a multinucleate, diploid holocarpic Plasmodium (a product of syngamy).

539 **(c)**
Powdery mildew diseases are characterized by the presence of fungal mycelium, conidiophores and conidia as white powdery patches on the host. Powdery mildew is caused by fungus, which belongs to Ascomycetes.

540 **(a)**
Galic acid, used in making ink is obtained with the help of *Aspergillus niger*.

541 **(c)**
Viruses are without necessary metabolic enzymes, hence free viruses are inert particles incapable of any vital activities and use host machinery regarded as obligate parasite and have characteristic of both living and nonlivings.

542 **(c)**
The crystal of viruses are actually composed of many individual complex units known as virions. The virion is now described as the basis structural unit of virus particle capable of infecting a specific host.

543 **(c)**
Mushrooms (*Agaricus* sp) are common edible fungi. Their fruiting bodies are used for eating.

544 **(a)**
Archaebacterium cannot live in less than 3M NaCl concentration.

545 **(d)**
Cosmid is a fragment of DNA of about 40,000 base pairs, inserted in bacteria along with foreign DNA to produce copies for gene library.

546 **(d)**
*Morchella esculenta*is an edible fungus grown in Punjab and Kashmir. Mushrooms are preferred for food, as these have a large amount of protein (21-30%) and are also rich in vitamins, carbohydrates, minerals and amino acids.

547 **(a)**
Viroids were discovered by **T O Diener**, a plant pathologist in 1971. Viroids are small, circular, single-stranded RNA molecules that are the smallest pathogens.

548 **(d)**
Rigid cell wall and flagellum.
Eubacteria is also called true bacteria. They are characterized by the presence of a rigid cell wall and if motile, a flagellum

549 **(d)**
Cauliflower mosaic virus is one of only a few double-stranded DNA plant viruses and as such it is a potential vector for the introduction of foreign DNA into plants

550 **(a)**
The kingdom-Plantae are multicellular eukaryotes with chlorophyll in the photosynthetic regions. The kingdom-Plantae includes green, brown and red algae, liverworts, mosses, ferns and seed plants with or without flower

551 **(a)**
During conjugation in *Paramecium*, the micronucleus undergoes successive divisions one of which is meiosis. The four haploid daughter nuclei are formed out of them three degenerate and one divides from them and form two gametic nuclei one male and one female.

552 **(a)**
Morels and truffles differ widely in their form and behavior. The morels resembles mushrooms to the extent that they have a cap borne upon a central stem, while the truffles forms solid, round balls, which grows underground. These are the edible Ascomycetes. Both morels and truffles, represents some of the most highly prized edible mushroom in the world

553 **(c)**
In all Basidiomycetes, except the rusts, a specialised hyphal structure known as clamp connection (or lamp) is formed on the secondary mycelium. It ensures the maintenance of a dikaryon.

554 **(c)**
*Entamoeba histokytica*is a microscopic endoparasite of man. It is commonly found in the upper part of large intestine and is very often lodged in liver, lungs, brain and testes. It invades the mucosa and submucosa of the intestinal wall and causes **amoebic dysentery** or **amoebiasis**. Infection depends upon intake of food or water contaminated with faecal matter. Houseflies

sitting on faecal matter of hosts containing cysts may transfer them to food stuff.

555 **(d)**
*E. histolytica*is a microscopic endoparasite found in the lumen of upper part of large intestine, *i. e.*, colon. Parasitologists believe that this this parasite lives there as harmless commensal but due to unknown reasons they invade the mucosa and submucosa of the intestinal wall and cause amoebic dysentery or amoebiasis.

556 **(d)**
The photosynthetic bacteria contain bacteriochlorophyll but lack chlorophyll-*a*.

557 **(a)**
Deuteromycota is commonly called as fungi imperfecti. This includes all those fungi in which sexual or perfect stage is not known.

558 **(b)**
Morels, truffles, yeast and *Penicillium* are all examples of class-Ascomycetes. Yeast is single cell member of class-Ascomycetes.
Penicillium is a genus of fungi, commonly growing as green or blue moulds on decaying food, used in making medicine (antibiotics)

559 **(b)**
Plasmids are small extrachromosomal or extranuclear, circular, double stranded DNA molecules that are separate from main bacterial chromosome and replicate independently.

560 **(b)**
Photosynthetic autotrophic bacteria includes blue-green algae, which have chlorophyll-*a* similar to the green plants

561 **(b)**
When freshwater protozoans are placed in marine water, *i. e.*, hypertonic water, the contractile vacuoles disappear because the process of endosmosis does not happen and thus, water does not come in the protoplasm.

562 **(d)**
R H Whittakerdivided living organisms into five kingdoms *viz*, monera, Protista, Fungi, Plantae and Animalia. Kingdom-Protista includes eukaryotic, unicellular, autotrophic or heterotrophic organisms (both plants and animals) like flagellates, diatoms, dinoflagellates, slime moulds, sarcodina, etc. Themajor groups of Protista are photosynthetic protists (algae), consumer-decomposer protists (slime moulds) and protozoan protists.

563 **(a)**
Euglenoids are unicellular flagellate protists. They are without cellulosic cell wall. The body is covered by thin and flexible pellicle. The pellicle is composed of fibrous elastin protein, small amount of lipid or/and carbohydrates.
The euglenoids have two flagella, usually one long and one short. Each flagellum arises from a basal granule (blepharoplast). The flagella bear hairs (=tinsels). They are photosynthetic in the presence of sunlight. They are considered as connecting link between plants and animals

564 **(c)**
Plant like nutrition is found in *Euglena*.

565 **(a)**
Usually plant viruses contain RNA but some plant viruses contain DNA as genetic material. Most animal viruses contain DNA but there are some exceptions (with RNA as genetic material) also. In tobacco mosaic virus and tomato mosaic virus, genetic material is ss-RNA, while bacteriophage lambda and bacteriophage T_4 possess a linear ds-DNA molecule as genetic material.

566 **(b)**
The main difference between Gram positive and Gram negative bacteria is due to **cell wall.** The cell wall of Gram negative bacteria contain **Peptidoglycan** (10%), lipopolysaccharides lipoprotein and phospholipid, while cell wall of Gram positive bacteria contain peptidoglycan (60-90%) , teichoic acid and lipids.

567 **(b)**
Plant virus contains RNA mostly as genetic materials. Plasmids are found in bacteria and yeasts.

568 **(b)**
Viroid were discovered by TO Diener in 1971 as a new infectious agent that was smaller than viruses. Viroids lack capsid and have not proteins associated with them

569 **(a)**
Prions have a distinct extracellular form made up of protein. The prion particle does not contain any nucleic acid. However, it is infectious and known to cause a variety of diseases in animals such as scrapie in sheep, bovine spongiform encephalopathy in cattle (BSE or mad cow disease), chronic wasting disease in deer, elk and kuru and a form of Creutzfeldt-Jakob Disease (CJD) in humans.

570 **(a)**
Cyanobacteria or blue-green algae are Gram positive photosynthesis prokaryotes, which performs oxygenic photoynthesis

571 **(d)**
Most animals have the ability to move fairly freely. Animals have specialised sensory and neuromotor system. Reproduction is generally sexual. Gamates are formed, mostly in multicellular organs called gonads (ovaries or testes).
Lower forms performs asexual reproduction also. The sexual reproduction takes place by copulation of male and female followed by embryological developement

572 **(d)**
In 1884, a Danish Biologist, **Christian Gram** developed a stain, which revealed that bacteria can be divided into two natural groups, *i. e.*, Gram positive and Gram negative due to differences in their cell wall structure. The outer membrane is present in Gram positive bacteria.

573 **(a)**
Mycorrhiza is an association between a fungus and root of higher plant. The plants provide a source of carbon used by the fungus and the fungus absorbs phosphorus or other minerals the plant might not otherwise obtain from soil.

574 **(a)**
The species of *Rhizopus* may be heterothallic or homothallic. The mycelium is aseptate and multinucleate called **coenocytic**.

575 **(c)**

Class	Example
Ascomycetes	Yeast, *Penicillium*
Basidiomycetes	*Agaricus*
Zygomycetes	*Rhizopus*
Phycomycetes	*Synchytrium*

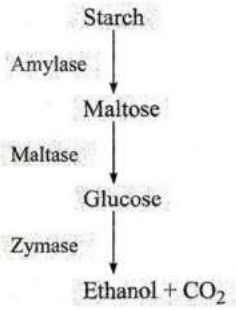
576 **(a)**
When microbes are grown in a closed system or batch culture, the resulting growth curve has usually four phases : lag phase, exponential (log phase), stationary phase and death phase.

577 **(d)**
In dinoflagellates the two flagella are different (heterodont), one transverse flagellum and other longitudinal flagellum. The longitudinal flagellum is narrow, smooth, directed posteriorly and lies in the sulcus.
The transverse flagellum is ribbon like and lies in cingulum or annulus. The two types of flagella beats in different directions

578 **(a)**
Protein coat is present in virus but absent in viroids. Viroids are the infectious agent, which have naked nucleic acid (mainly RNA)

579 **(c)**
Yeasts are used for producing enzyme invertase and vitamin riboflavin.

580 **(c)**
Yeast (*Saccharomyces*) produces enzymes amylase, maltase and zymase. Amylase breaks down starch into maltose; maltase converts maltose into glucose and the glucose is converted by zymase to ethanol and carbon dioxide.



581 **(d)**
Most of the monerans and fungi are decomposers, *i. e.*, biotic component of the ecosystem.

582 **(b)**
Plasmid is a small, autonomously independent, self-replicating extranuclear DNA, imparting certain factors to some bacterium. It is carried by the bacterium in addition to its genomic DNA.

583 **(b)**
The bacterium *Clostridium botulinum*, causing botulism (a form of food poisoning) is an **obligate anaerobic** endospore forming, Gram positive, rod-shaped bacterium found in soil and in many fresh water sediments.

584 **(b)**
Kingdom-Monera includes all prokaryotic autotrophic or heterotrophic organisms *viz.*, mycoplasms, bacteria, Actinomycetes (mycelia bacteria) and photosynthetic cyanobacteria. On the other hand, all unicellular eukaryotic organisms like flagellates, diatoms, dinoflagellates, slime moulds, sarcodina, etc, are grouped under kingdom-Protista.

585 **(c)**
Nitrogen fixation

Cyanobacteria have chlorophyll-*a*, similar to green plants and are photosynthetic autotrophs. Some of these organisms can fix atmospheric nitrogen in toe specialized cells called heterocysts, *e. g.*, *Nostoc* and *Anabaena*

586 **(b)**
Archaebacteria is primitive group of bacteria. The three main groups of archaebacteria are methanogens, halophiles and thermoacidophiles. Methanogens are obligate, anaerobic archaebacteria which oxidize CO_2 during cellular respiration to produce methane as a waste product. They are found in the musk of swamps and marshes, the rumen of cattle sewage sludges and gut of termites, *e. g.*, *Methanococcus jannaschii*, *Methanobacterium.*

587 **(c)**
The foolish seeding disease of rice was caused by perfect fungus *Gibberella fujikuroi*. It is an ascomycetous fungus.

588 **(d)**
HIV virus reduces the numbers of **helper T-cells** in AIDS patients.

589 **(b)**
Cholera, typhoid and tetanus.
Bacteria are helpful in making curd from milk, production of antibiotic, fixing nitrogen in legume roots, etc. Some bacteria are pathogens, causing damage to human being, crops, farm animals and pets. Cholera typhoid, tetanus, citrus canker are well known diseases caused by different bacteria

590 **(d)**
White rust of crucifers is caused by a fungus *Albugo candida*, which is mycelial and eucarpic, mycellium intercellular, branched, asepatate and multinucleate (coenocytic).

591 **(b)**
Fungi absorbs nutrients directly from the living host cytoplasm are called parasites

592 **(b)**
The genus—*Physarinm* with about 100 species is the largest and best-studied slime mould in the class-Myxomycetes.

593 **(a)**
Statement I is true, but II is false.
Bacterial viruses or bacteriophase have commonly double stranded DNA but all the other genome types also occur in them

594 **(b)**
Lithosere is a type of xerosere originating on bare rock surfaces. The original substratum is deficient in water and lacks any organic matter having only minerals in disintegrated unweathered state. The pioneer vegetation is, therefore, lichens.

595 **(c)**
Hot sulphur spring.
Archaebacteria is a primitive group of bacteria
The three main groups of archaebacteria are methanogens, halophiles and thermoacidophiles.
Methanogens are found in the musk of swamps and marshes, the rumen of cattle, sewage, sludges and gut of termites
Halophiles are named so because they usually occur in salt rich substrata like salt pans, salt beds and salt marshes
Thermoacidophiles have dual ability to tolerate high temperature as well as high acidity. They often live in hot sulphur springs where the temperature may be as high as 80°C. and pH as low as 2