

**Question Bank**  
**St. Xavier's College Mahuadanr**  
**Department of Botany**  
**Algae & Microbiology**  
**Semester- I Core Course – 1**  
**By Sr. Kaslin Juliet**

**Multiple Choice questions:**

1. Who discovered bacterial transformation?
  - a) Jenner
  - b) Griffith**
  - c) Messelson
  - d) Tatum
2. Who is known as the father of microbiology?
  - a) Rastour
  - b) Koch
  - c) Leewenhoek**
  - d) Robert Hook
3. Who developed small pox vaccine for the first time?
  - a) Koch
  - b) Jenner**
  - c) Pasteur
  - d) Lister
4. Antiseptic properties were first described by
  - a) Jenner
  - b) Pasteur
  - c) Lister**
  - d) Beijernic
5. Who discovered the process of phagocytosis?
  - a) Mechnikov**
  - b) Robert Koch
  - c) Alexander Fleming
  - d) Pasteur
6. Scientist who proved DNA and not protein as the genetic material;
  - a) Hershey and chase**

- b) Beadle and Tatum
  - c) Pasteur
  - d) Jenner
7. The phenomenon of transformation was first described in;
- a) E.Coli
  - b) Bacillus substilis
  - c) **Pneumococci**
  - d) Vibrio
8. Bacterial conjugation was discovered by:
- a) Griffith
  - b) Robert Koch
  - c) **Lederberg and Tatum**
  - d) Pasteur
9. Who coined the term bacteriophage for the first time?
- a) Beijernick
  - b) Tautum
  - c) **De'Herelle**
  - d) Pasteur
10. The term vaccine was coined by
- a) **Pasteur**
  - b) Robert Koch
  - c) Jenner
  - d) Jenner and Pasteur
11. Viruses range in size from:
- a) 1-100 nm
  - b) **25-300 nm**
  - c) 10-100  $\mu\text{m}$
  - d) 400-1000 nm
  - e) 1-10  $\mu\text{m}$
12. A structural component that is found in all viruses is:
- a) The envelope

- b) DNA
- c) Capsid**
- d) Tail fibers
- e) Spikes

13. A chemical component that is found in all viruses is:

- a) Protein**
- b) Lipid
- c) DNA
- d) RNA
- e) Glycoproteins

14. A common polyhedral capsid shape of viruses is a :

- a) Pentagon
- b) Cube
- c) Icosahedron**
- d) Pyramid
- e) Sphere

15. Enteroviruses differ from rhinoviruses mainly in their:

- a) Type of nucleic acid
- b) Size
- c) Capsid shape
- d) Ability to survive acidic conditions**
- e) Strandedness

16. Viruses that can remain latent (usually in neurons) for many years are most likely:

- a) Togaviruses
- b) Herpesviruses**
- c) Enteroviruses
- d) Rhinoviruses
- e) Retroviruses

17. What types of viruses contain the enzyme lysozyme to aid in their infection?

- a) Bacteriophage**
- b) Animal Viruses

- c) Plant Viruses
- d) Fungal Viruses
- e) Human Viruses

18. Bacteriophage are readily counted by the process of:

- a) Immunoassays
- b) ELISA
- c) **Plaque assays**
- d) Tissue cell culture
- e) Electron Microscopy

19. A type of cell culture that can reproduce for an extended number of generations and is used to support viral replication is a :

- a) Primary cell culture
- b) **Continuous cell line**
- c) Cell strain
- d) Diploid fibroblast cell
- e) Connective tissue

20. Which of the following is not an RNA virus?

- a) Retrovirus
- b) Enterovirus
- c) Rhabdovirus
- d) Adenovirus
- e) **Rubellavirus**

21. All the bacteria fix nitrogen except

- a) Rhizobium
- b) **E.coli**
- c) Azotobacter
- d) cyanobacteria

22. Differential staining of bacteria on Gram staining is due to

- a) **difference in the cell wall layer components of Gram positive and Gram negative bacteria**

- b) difference in the cell structure of Gram positive and Gram negative bacteria
  - c) difference in the mode of nutrition of Gram positive and Gram negative bacteria
  - d) none of the above
23. The iodine used in Gram staining serves as a
- a) chelator
  - b) catalyst
  - c) **mordant**
  - d) cofactor
24. Which among the following is called as filamentous bacteria
- a) Mycoplasmas
  - b) Spirochetes
  - c) **Actinomycetes**
  - d) Vibrios
25. Which of the following group of bacteria is considered as a link between bacteria and virus
- a) **Mycoplasmas**
  - b) Spirochaetes
  - c) Actinomycetes
  - d) Vibrios
26. Cork-screw shaped forms of bacteria are
- a) bacilli
  - b) stalked bacteria
  - c) **spirochaetes**
  - d) actinomycetes
27. The ability of bacteria to change their morphological form frequently is termed as
- a) lysogeny
  - b) **pleomorphism**
  - c) alteromorphism
  - d) none of these

28. Bacterial cell wall is made up of
- a) chitin
  - b) cellulose
  - c) dextran
  - d) **peptidoglycan**
29. Bacterial flagella is made up of
- a) microtubules
  - b) tubulin
  - c) **flagellin**
  - d) spinin
30. Surface appendage of bacteria meant for cell-cell attachment during conjugation is
- a) **pili**
  - b) flagella
  - c) spinae
  - d) cilia
31. Spinae is rigid tubular appendages in
- a) **Gram positive bacteria**
  - b) Gram negative bacteria
  - c) both a and b
  - d) actinomycetes
32. The region where bacterial genome resides is termed as
- a) nucleus
  - b) cytoplasm
  - c) **nucleoid**
  - d) ribosome free region
33. Bacterial chromosome is
- a) single stranded and circular
  - b) **double stranded and circular**
  - c) single stranded and linear
  - d) double stranded and linear

34. Extra chromosomal, circular, double stranded, selfreplicating DNA molecule in bacteria is called

- a) cosmid
- b) plasmid**
- c) phagemid
- d) phasmid

35. Membraneous in folding in bacteria that initiate DNA replication is

- a) mesosomes**
- b) carboxysome
- c) magnetosome
- d) nucleosome

36. Agar-Agar is obtained from

- a) Gelidium**
- b) Polysiphonia
- c) Fucus
- d) Laminaria

37. Plants which are not differentiated into roots, stem and leaves are grouped under

- a) Gymnosperms
- b) Pteridophytes
- c) Thallophytes**
- d) Spermatophytes

38. Which are the most primitive group of algae

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

39. Iodine is obtained from

- a) Ulothrix
- b) Ectocarpus
- c) Laminaria**
- d) Oedogonium

40. Which of the following is the most advanced group of algae

- a) Cyanophyta
- b) Rhodophyta**
- c) Phaeophyta
- d) Chlorophyta

41. Which of the algae is responsible for red colour of red sea

- a) Chlamydomonas braunii
- b) Trichodesmium erythrium**
- c) Ulothrix zonata
- d) None of the above

42. One of the following is present in blue green algae

- a) Starch
- b) Cyanophacean granule**
- c) Any polysaccharide
- d) Floridian starch

43. Ability to fix atmospheric nitrogen is found in

- a) Leaves of some crop plants
- b) Chlorella
- c) Some marine red algae
- d) Some blue green algae**

44. Origin and evolution of sex in algae is best seen in

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

45. Kelps is obtained from

- a) Algae
- b) Marine algae**
- c) Aquatic algae
- d) Lichens

46. Algae differ from Riccia ana Marchantia in having

- a) Multicellular body
- b) Multicellular sex organs
- c) Pyrenoids in the cell**
- d) Thalloid body

47. Heterocysts are

- a) Green and thin walled
- b) Green and thick walled
- c) Colourless and thin walled
- d) Colourless and thick walled**

48. Zygotic meiosis is a characteristic feature of

- a) Algae**
- b) Bryophytes
- c) Pteridophytes
- d) Gymnosperms

49. Cephaleoures is

- a) An epiphytic green algae
- b) A parasitic green algae**
- c) A fresh water green algae
- d) A colourless red algae

50. Sargasso sea is named after an algae Sargassum which is a

- a. Green algae
- b. Brown algae**
- c. Red algae
- d. Blue green algae

51. Find the correct statement

- (a) *Paramecium*, *Penicillium* and *Plasmodium* belong to the same kingdom
- (b) *Nostoc* and *Anabaena* come under Protista
- (c) lichen is a symbiotic association of an alga and Protozoan
- (d) Yeast is a fungus and is used in bread and beer production**

52. Cyanobacteria are

- (a) oxygenic without nitrogenase
- (b) non-oxygenic without nitrogenase
- (c) oxygenic with nitrogenase**
- (d) non-oxygenic with nitrogenase

53. Blue-green algae are included in

- (a) Prokaryotes**
- (b) Protista
- (c) Fungi
- (d) Bryophytes

54. An organism that forms a symbiotic association with *Anthoceros*

- (a) *Spirogyra*
- (b) Nostoc**
- (c) *Ulothrix*
- (d) All of the above

55. Which of the following structure contains a polar nodule on both ends

- (a) heterocyst**
- (b) hormogonia
- (c) akinetes
- (d) *None of the above*

56. *Nostoc* form

- (a) compound colony
- (b) simple colony
- (c) both (a) and (b)**
- (d) None of these

57. Which of the angiosperm contains *Nostoc* as an endophyte

- (a) *Gunnera manicata***
- (b) *Arachis hypogea*
- (c) *Melia indica*
- (d) None of the above

58. Coloured portion of the nostoc cell is

- (a) genophore
- (b) inner centropiasm
- (c) outer chromoplasm**
- (d) central body

59. Heterocyst of *Nostoc* are

- (a) intercalary**
- (b) terminal
- (c) both terminal and intercalary
- (d) none

60. Sexual reproduction is absent in

- (a) *Volvox*
- (b) Nostoc**
- (c) *Aspergillus*
- (d) *Ulothrix*

61. Who is regarded as the "Father of Indian Phycology"

- 1) Prof. M.O.P. Iyenger**
- 2) Prof. J.N. Mishra
- 3) Prof. R.R. Mishra
- 4) Prof. R.N. Singh

62. Phycology is the study of

- a) Algae**
- b) Fungi
- c) Bacteria
- d) All the above

63. Who is popularly known as the "Father of Phycology"

- a) Fritsch**
- b) Papenfus

- c) Smith
- d) Morris

64. The classification of algae is based on

- a) Type of pigment
- b) Nature of cell wall material
- c) Nature of reserve food
- d) **All the above**

65. Sexual reproduction and mobile cells are absent in

- a) Chlorophyceae
- b) **Myxophyceae**
- c) Rhodophyceae
- d) Phaeophyceae

66. Iodine is obtained from the members of

- a) Green algae
- b) **Brown algae**
- c) Red algae
- d) Blue?green algae

67. Example of coenocytic algae is

- a) **Vaucheria**
- b) Chara
- c) Nostoc
- d) Polysiphonia

68. In the life cycle of which group flagellated cells are not formed

- a) Chlorophyceae
- b) Phaeophyceae
- c) **Rhodophyceae**
- d) Both (b) and (c)

69. Coenobium means

- a) **A hollow spherical colony**

- b) A group of filaments
- c) Palmelloid form
- d) None of the above

70. Which one of the following is not an accessory pigment

- a) **Chlorophyll 'a'**
- b) Chlorophyll 'e'
- c) Phycocyanin
- d) Xanthophyll

71. In physiological anisogamy

- a) **Gametes are morphologically similar but physiologically dissimilar**
- b) Gametes are morphologically dissimilar but physiologically similar
- c) Gametes are morphologically and physiologically similar
- d) None of the above

72. Fusion of mature individuals which directly act as gametes, is called

- a) Isogamy
- b) Anisogamy
- c) **Hologamy**
- d) Autogamy

73. A motile flagellated asexual cell is called

- a) Sperm
- b) **Zoospore**
- c) Oospore
- d) Androspore

74. Gametes formed by meiosis are called

- a) Coenogametes
- b) **Meiogametes**
- c) Mitogametes
- d) None of these

75. Which one is a parasitic algae

- a) Vaucheria
- b) Polysiphonia
- c) **Cephaleuros**
- d) Batrachospermum

76. Algal cell wall is composed of

- a) Chitin
- b) Cutin
- c) Cellulose
- d) Suberin

77. An example of agarophyte is

- a) Dictyota
- b) Fucus
- c) Nostoc
- d) **Gelidium**

78. Algae which form motile colony is

- a) **Volvox**
- b) Nostoc
- c) Spirogyra
- d) Chlamydomonas

79. Sporophytic generation is represented by zygote only in

- a) Funaria
- b) Chlamydomonas
- c) Pinus
- d) Selaginella

80. In biotechnological studies, the alga that is exploited as a rich source of protein is

- a) Spirogyra

- b) **Spirulina**
- c) Chlamydomonas
- d) Scytonema

81. More than one pyrenoid are present in

- a) Ulothrix
- b) Spirogyra
- c) Oedogonium
- d) **All the above**

82. The non-motile, greatly thickened asexual spores are called

- a) **Hypnospores**
- b) Aplanospores
- c) Macrozoospores
- d) Microzoospores

83. Which one of the following statements concerning the algae is wrong

- a) Most algae are photosynthetic
- b) Algae can be classified according to their pigments
- c) **All algae are filamentous**
- d) Spirogyra does not produce zoospores

84. Which among the following do you consider as the best evidence to show that two species of algae are closely related

- a) They both respire and release CO<sub>2</sub>
- b) They both are found in the same habitat
- c) They both reproduce asexually
- d) **They both have same type of pigments**

85. Pyrenoids are the centre of formation of

- a) Enzymes
- b) Proteins

- c) Fats
- d) **Starch**

86. Algae are important, we should study algae because

- a) They are good organisms to experiment with
- b) They can be grown in large tank cultures
- c) **They may form important constituent of human food (diet) in future**
- d) They produce oxygen and organic acids

87. The simplest green plants are

- a) Yeast
- b) Bacteria
- c) **Algae**
- d) Lactobacillus

88. Thermal algae are forms which grow and survive

- a) In tropical regions where the temperature range is high
- b) **In hot water springs where the temperature remains around 70°C**
- c) On the huge rocks exposed to bright sunlight
- d) In deserts where the temperature in summer remains around 70°C

89. Rhodophyceae is red coloured due to

- a) Xanthophyll
- b) Carotenoids
- c) **phycoerythrin**
- d) phycocyanin

90. In the Chlorophyta, the reserve food of protein surrounded by starch, form a compact body termed

- a) Paramylum
- b) **Pyrenoid**
- c) Volutin
- d) Eye spot

91. Algae are in the same major group of plants as are the

- a) Mosses
- b) Liverworts
- c) **Fungi**
- d) Ferns

92. Alga rich in protein is

- a) **Chlorella**
- b) Spirogyra
- c) Oscillatoria
- d) Ulothrix

93. A filament of an alga can be differentiated from that of a fungus by

- a) Cells are uninucleate in algae whereas they are multinucleate in fungi
- b) Chlorophyll present in algae and absent in fungi
- c) **The presence of cellulose cell wall and chlorophyllous cells in algae while chitinous cell wall and non-chlorophyllous cells in fungi**
- d) The algae are green and fungi are non-green

94. Red eye spot containing haematochrome is meant for

- a) Photosynthesis
- b) Respiration
- c) **Photoreception**
- d) Movements

95. Zygosporangium is

- a) Haploid
- b) Polyploid
- c) **Diploid**
- d) None of the above

96. Palmella stage is produced

- a) In rainy season
- b) During unfavourable conditions**
- c) During favourable conditions
- d) None of the above

97. All cells of sex organs are formed gametes in

- a) Algae**
- b) Bryophyta
- c) Pteridophyta
- d) Gymnosperm

98. Pyrenoids are made up of

- a) Core of starch surrounded by sheath of protein
- b) Core of protein surrounded by fatty sheath
- c) Proteinaceous centre and starchy sheath**
- d) Core of nucleic acid surrounded by protein sheath

99. Floridean starch is found in

- a) Chlorophyceae
- b) Rhodophyceae**
- c) Myxophyceae
- d) Cyanophages

100. Pyrenoids are characteristically found in the chloroplast of

- a) Fungi
- b) Algae**
- c) Pteridophytes
- d) Angiosperms

101. The giant algae or sea weeds belong to class

- a) Phaeophyceae**

- b) Rhodophyceae
- c) Chlorophyceae
- d) Xanthophyceae

102. Most important alga in research centres is

- a) Mycoplasma
- b) Spirogyra
- c) **Chlorella**
- d) Blue-green algae

103. Amongst plants which one of the following group has been classified on the basis of pigments

- a) **Algae**
- b) Fungi
- c) Bryophyta
- d) Pteridophyta

104. Algae differ from Bryophyta in possessing

- a) **Naked sex organs**
- b) Sex organs covered with sterile covering
- c) Chlorophylls a and b
- d) Aerobic respiration

105. Red rust of tea is caused by

- a) **Cephaleuros**
- b) Synchytrium
- c) Mucor
- d) Fusarium

106. In which of the following algal classes the starch and oil are present

- a) Chlorophyceae
- b) Phaeophyceae
- c) Rhodophyceae
- d) **Xanthophyceae**

107. Which of the following pigments is present in all algae

- a) **Chlorophyll-a**
- b) Chlorophyll-b
- c) Chlorophyll-c
- d) Chlorophyll-d

108. Brown algae is characterised by the presence of

- a) Phycocyanin
- b) Phycoerythrin
- c) **Fucoxanthin**
- d) Haematochrome

109. The element present in thyroxin is obtained from

- a) **Laminaria**
- b) Polysiphonia
- c) Porphyra
- d) Gelidium

110. Which of the following is obtained from algae

- a) Wax
- b) Butter
- c) Chocolate
- d) **Carragenin**

111. Marine algae flourished well during which period

- a) Triassic
- b) Devonian
- c) Permian
- d) **Ordovician**

112. Stomata are not found in

- a) **Algae**
- b) Mosses
- c) Ferns
- d) Gymnosperm

113. Smallest plant which contain green pigment such as higher green plant is

- a) Schizomycetes
- b) Rhodophyceae
- c) **Chlorophyceae**
- d) Phaeophyceae

114. Chlamydomonas does not occur in

- a) Fresh water
- b) Pond and lake
- c) River
- d) **Ocean**

115. Sexual reproduction in algae results in the formation of

- a) Oospore
- b) Zoospore
- c) Zygote
- d) **Zygospore**

116. Plants manufacturing their own food are called

- a) Epiphytes
- b) Parasites
- c) Saprophytes
- d) **Autotrophs**

117. Sex organs of thallophytes are generally

- a) **Unicellular**
- b) Multicellular but not surrounded by any jacket
- c) Multicellular surrounded by a sterile jacket
- d) Unicellular with a sterile jacket

118. Thallophytes are

- a) Always autotrophic

- b) Always heterotrophic
- c) **Both (a) and (b)**
- d) None of the above

119. Most primitive members of the plant kingdom are

- a) **Thallophytes**
- b) Bryophytes
- c) Pteridophytes
- d) Gymnosperms

120. Meiotic division in zygote takes place in

- a) **Thallophyta**
- b) Angiosperms
- c) Gymnosperms

121. Thallophyta includes

- a) Fungi and bryophyta
- b) Algae and bryophyta
- c) Algae, fungi and bryophyta
- d) **Algae and fungi**

122. Sea weeds are important source of

- a) **Chlorine**
- b) Fluorine
- c) Iodine
- d) Bromine

123. The thallus of Volvox is called

- a) Trichome
- b) **Coenobium**
- c) Coenocyte
- d) Parenchymatous

124. Batrachospermum is found in

- a) Marine water
- b) Fresh water**
- c) Tree
- d) Arctic zone

125. In oogamy, fertilization involves

- a) A large non-motile female gamete and a small non-motile male gamete
- b) A large motile female gamete and a small non-motile male gamete
- c) A small non-motile female gamete and a large motile male gamete
- d) A large non-motile female gamete and a small motile male gamete**

126. Agar agar is obtained from

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

127. Agranal chloroplast are found in

- a) Bryophytes
- b) Gymnosperms
- c) Green algae**
- d) Angiosperms

128. Algae attached to stone is called

- a) Epilithic**
- b) Epifolic
- c) Coenolithic
- d) None of these

129. Pyrenoids in green algal cells are related to

- a) Starch formation**
- b) Protein storage
- c) General metabolism
- d) Enzyme secretion

130. Reserve food material of algae is
- a) **Starch**
  - b) Glycogen
  - c) Fat
  - d) Sugar
131. In chlamydomonas the meiosis occurs in
- a) Gamete
  - b) **Zygote**
  - c) Sporogonium
  - d) Zoospore
132. Which of the following form contain algae
- a) Equisetum
  - b) Selaginella
  - c) Marsilea
  - d) **None of these**
133. Alginic acid is obtained from
- a) Red algae
  - b) Green algae
  - c) Diatoms
  - d) **Brown algae**
134. The pigment phycoerythrin is characteristic of
- a) Green algae
  - b) Brown algae
  - c) **Red algae**
  - d) Blue green algae
135. Which of the following is a flagellated alga
- a) **Chlamydomonas**
  - b) Ulothrix
  - c) Spirogyra

d) Acetabularia

136. Which of the following is a nitrogen fixer

- a) Ulothrix
- b) **Anabaena**
- c) Ulva
- d) Hydrodictyon

137. Bioluminescence is a phenomenon associated with

- a) chrysophyta
- b) phaeophyta
- c) **pyrrophyta**
- d) chlorophyta

138. Which of the following algal divisions is characterized by possession of chlorophylls A and B, starch as the energy storage material, cellulosic cell walls and live in freshwater and marine habitats?

- a) **Chlorophyta**
- b) Chrysophyta
- c) Phaeophyta
- d) Pyrrophyta

139. All algae possess

- a) nuclei
- b) chloroplasts
- c) **Both (a) and (b)**
- d) none of these

140. Chlamydomonas and Volvox are similar because

- a) they both are motile
- b) they are members of the Chlorophyta
- c) **Both (a) and (b)**
- d) none of these

141. Which algal division never produces motile, flagellated cells among any of its members?

- a) Chlorophyta
- b) Chrysophyta
- c) Phaeophyta
- d) **Rhodophyta**

142. Algae are classified into 6 groups, technically known as

- a) categories
- b) **divisions**
- c) genera
- d) domains

143. The \_\_\_\_\_ is the vegetative body of algae.

- a) mycelium
- b) plasmodium
- c) pseudoplasmodium
- d) **thallus**

144. Algae are found in all of the following places except

- a) oceans
- b) soils
- c) **lakes and streams**
- d) associates with fungi

145. There is a complete absence of sex organs in

- a) Chlorophyceae
- b) **Blue green algae**
- c) Red algae
- d) None

146. Chromoplasm in the cyanophycean cell is the

- a) Cell wall
- b) **Peripheral layer**
- c) Central part
- d) Nucleus

147. Fucus belong to the class

- a) Chlorophyceae

- b) **Phaeophyceae**
- c) Mixophyceae
- d) Rhodophyceae

148. Fragmentation is a method of
- a) **Vegetative reproduction**
  - b) Asexual reproduction
  - c) Sexual reproduction
  - d) Special type of reproduction
149. To make water fresh and transparent chara releases
- a)  $\text{KMnO}_4$
  - b)  $\text{Ca}(\text{OH})_2$
  - c)  **$\text{CaCO}_3$**
  - d)  $\text{O}_2$
150. Tetrasporophyte is produced by the germination of
- a) Zygote
  - b) **Carospores**
  - c) Tetraspore
  - d) None

**Short questions:**

1. Discuss the economic importance of viruses
2. Describe the Microbial nutrition
3. Growth and metabolism of Viruses
4. Discuss the economic importance of bacteria
5. Classification of virus based on Baltimore theory
6. T-phage/ DNA virus
7. RNA virus (TMV).
8. Replication
9. lysogenic cycle
10. RNA virus
11. Describe various types of Bacteria
12. Describe wall-less forms of Bacteria
13. Bacterial Conjugation
14. Transformation in bacterial reproduction
15. Describe Transduction in Bacteria
16. Give an illustrated Cell structure of Bacteria
17. Explain nutritional types in Bacteria

18. Describe the significant contributions of important phycologists
19. Give an account of range of thallus organization in Algae
20. Describe flagella
21. Give an account of different methods of reproduction in Algae
22. Write short notes on following about Algae:
  - a) Cell structure and components
  - b) cell wall
  - c) pigment system
  - d) reserve food
23. Describe Ecology and distribution of Algae
24. Explain with suitable diagram Cell structure of Chlamydomonas
25. Akinete
26. Modes of vegetative reproduction in Volvox
27. Explain Macrandrous & Nannandrous forms of reproduction
28. Explain the post fertilization in Polysiphonia
29. Describe Fragmentation and binary fission
30. Explain sexual reproductive organs in Chara

**Long questions:**

1. Explain in details Microbial nutrition, growth and metabolism
2. Discuss the economic importance of viruses with reference to vaccine production, role in research, medicine and diagnostics, as causal organisms of plant diseases.
3. Discuss the economic importance of bacteria with reference to their role in agriculture and industry (fermentation and medicine)
4. Describe physiochemical and biological characteristics; classification based on Baltimore method on Virus
5. Explain in details General structure with special reference to viroids and prions
6. Describe in details general characteristics, types of Bacteria
7. Explain the different methods of reproduction in Bacteria
8. Give an account of different methods of reproduction in Algae
9. Explain in details role of algae in the environment, agriculture, biotechnology and industry.
10. Give an account of life-cycle of Nostoc
11. Explain the life cycle of Vaucheria
12. Describe the systematic position, structure and reproduction in Chlamydomonas
13. Describe the life-cycle of Volvox
14. Describe the systematic position, structure and reproduction in Oedogonium
15. Describe the structure and reproduction in Coleochaete
16. Explain the Occurrence, Features and Reproduction in Chara
17. Evolutionary significance of Prochloron
18. Describe the systematic position, structure and reproduction in Ectocarpus
19. Describe the life-cycle of Fucus

20. Describe the systematic position, structure and reproduction in Polysiphonia.