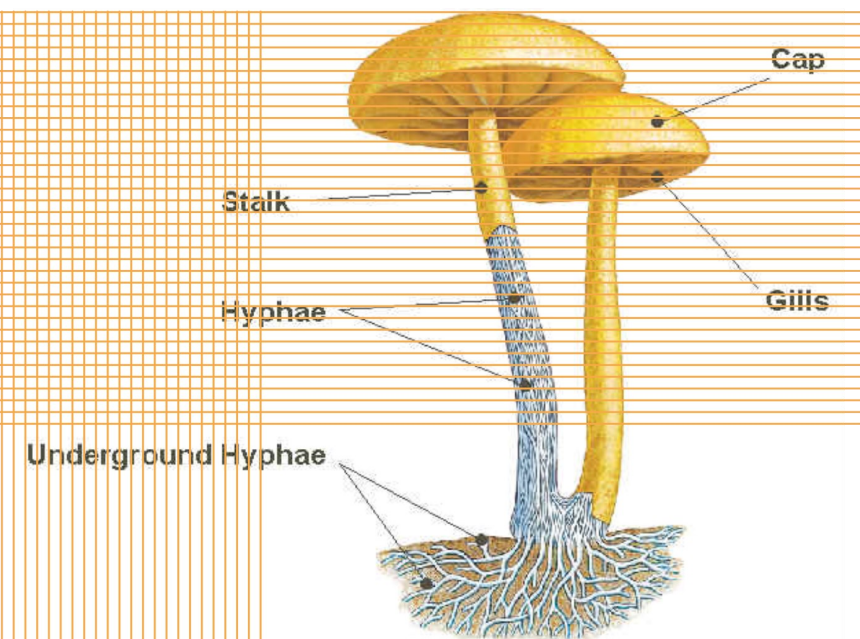


UNIT **03** Book 3

ADVANCED LEVEL

Biology
Revision 2025
 in English Medium



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The diversity of organisms within the kingdom Fungi

Kingdom Fungi

Characteristic features of Kingdom Fungi

- Eukaryotic
- Cell walls are made up of chitin a strong but flexible polysaccharide.
- They are absorptive and heterotrophs - many of them secrete extra cellular enzymes which aid in the breaking down of complex molecules into small molecules.
- Different species live as decomposers, parasites or mutualistics.
- Few are unicellular, others forming multicellular filaments called hyphae .
- Septa can be found in hyphae. (division of hyphae into cells by septa – cross walls).

1.	Fungi have cell walls made up of chitin.	
2.	All fungi are multicellular and form filaments called hyphae.	
3.	Septum in fungi is completely solid with no openings.	
4.	Coenocytic fungi are those that lack septa and contain many nuclei.	
5.	Fungi are autotrophic organisms.	
6.	Haustoria are specialized structures used by some fungi to penetrate and absorb nutrients from plants.	
7.	Chytridiomycota produce non-motile spores for reproduction.	
8.	In Zygomycota, septa are found throughout all parts of the mycelium.	
9.	Zygosporangium is resistant to drying and freezing.	
10.	Ascomycota produce spores called conidia endogenously within specialized hyphae.	
11.	Typically eight ascospores are produced in each ascus in Ascomycota.	
12.	Basidiomycota are primarily aquatic fungi.	
13.	The dikaryotic mycelium is the dominant stage in the life cycle of Basidiomycota.	
14.	Fungi can function as decomposers, parasites, or mutualists in ecosystems.	
15.	Basidiospores are produced inside the basidium.	
16.	Mucor and Rhizopus are examples of Zygomycota.	
17.	Asexual reproduction is common in Basidiomycota.	
18.	Aspergillus and Penicillium are examples of Ascomycota.	
19.	Fungi secrete enzymes to break down complex molecules into smaller molecules for absorption.	
20.	The mycelium in Zygomycota is coenocytic and aseptate except where reproductive cells are formed.	

19. The phylum includes aquatic or terrestrial fungi like Chytridium that produce which are flagellated, for reproduction. Some members of this phylum arewhile others are parasitic. The phylum, represented by Mucor and Rhizopus, is characterized by a mycelium that is aseptate, with septa found only where cells are formed. During asexual reproduction, they produce in which genetically identical haploid spores are endogenously produced. The phylum includes examples such as Aspergillus, Saccharomyces, and Penicillium which can be marine, freshwater, or In asexual reproduction, they produce exogenously at the tip of specialized hyphae called conidiophores. During sexual reproduction, they form sac-like structures called which typically contain ascospores. The phylumincludes terrestrial fungi like Agaricus, puffballs, and shelf fungi. They are characterized bymycelium with septa, which is the dominant stage of their life cycle. During sexual reproduction, they produce fruiting bodies called and form on basidia, which are produced exogenously.

20. Find the relevant fungal phylum

Produces zoospores with flagella	:
Coenocytic and aseptate mycelium	:
Produces eight ascospores in asci	:
Produces basidiocarps and basidia	:
Can be aquatic or terrestrial	:
Mycelium is dikaryotic	:
Produces zygosporangia resistant to drying	:
Produces conidia on conidiophores	:
Produces ascocarps	:
Examples include Mucor and Rhizopus	:
Examples include Agaricus and puffballs	:
Examples include Penicillium and Saccharomyces	:
Example includes Chytridium	:
Septa found only where reproductive cells form	:
Asexual reproductive structures not common	:

- Septum has a hole which enables the movement of mitochondria, ribosomes, nuclei etc.
- Fungi lack septa are known as coenocytic fungi (with many nuclei)
- Fungal hyphae produce mycelium
- Some fungi produce haustoria (to penetrate and absorb or exchange nutrients between plants and the fungi)
- Multicellular fungi produce mycelia. (a network of branched hyphae adapted for absorption of nutrition)
- They show sexual and asexual reproduction.
- They produce spores.

Characteristic features of Phylum Chytridiomycota

e.g.: *Chytridium*

- Aquatic or terrestrial .
- Some are decomposers while others are parasitic.
- Multicellular or unicellular when multicellular it is coenocytic.
- They produce zoospores which are flagellated, for reproduction.
- Cell walls are made up of chitin.
- Some of them form colonies with hyphae while others exists as single spherical cell.

Characteristic features of Phylum Zygomycota

e.g. *Mucor*, *Rhizopus*

- Most of them are saprotrophs and some of them are parasites or commensals.
- Mycelium is coenocytic and aseptate. Septa found only where reproductive cells are formed.
- Asexual reproduction: Produce sporangia in which genetically identical haploid spores are endogenously produced called sporangiospores.
- Sexual reproduction: A Zygosporangium is produced which is a sturdy structure produced by plasmogamy and karyogamy. Zygosporangium is resistant to unfavorable environmental conditions.
 - o Zygosporangium is a multinucleated structure which is resistant to drying and freezing.
 - o They are metabolically inactive in adverse environmental conditions.
- Zygosporangium produces genetically diverse haploid spores when environmental conditions are favourable.

Characteristic features of Phylum Ascomycota

e.g. *Aspergillus*, *Saccharomyces*, *Penicillium*

- Marine or freshwater or terrestrial
- Parasitic or symbiotic.
- Most of them are decomposers.
- Unicellular or filamentous, multicellular.
- In asexual reproduction conidia are produced exogenously at the tip of the conidiophores which are specialized hyphae.
- In sexual reproduction fusion of sexually differentiated gametangia takes place and produce sac like structure called asci.
- Ascospores are produced within asci. Generally there are eight ascospores are produced in each ascus.
- Most of these fungi produce ascocarps enclosing asci.

Characteristic features of Phylum Basidiomycota

e.g. *Agaricus*, Puffballs, Shelf fungi

- They are Terrestrial.
- They are major decomposers and some are symbionts.
- Filamentous with septae and dikaryotic.
- Dikaryotic mycelium is the dominant stage of the life cycle.
- They produce fruiting bodies called basidiocarps during sexual reproduction. Produce basidia on the gills of the basidiocarp.
- Produce exogenous basidiospores on basidium.
- Asexual reproductive structures are not common.

14. Fungal phyla with unicellular members

.....

15. Fungal phyla with parasitic members.

.....

16. Fungal phylum without common asexual reproducing structure

.....

17. Fungal phyla with terrestrial members

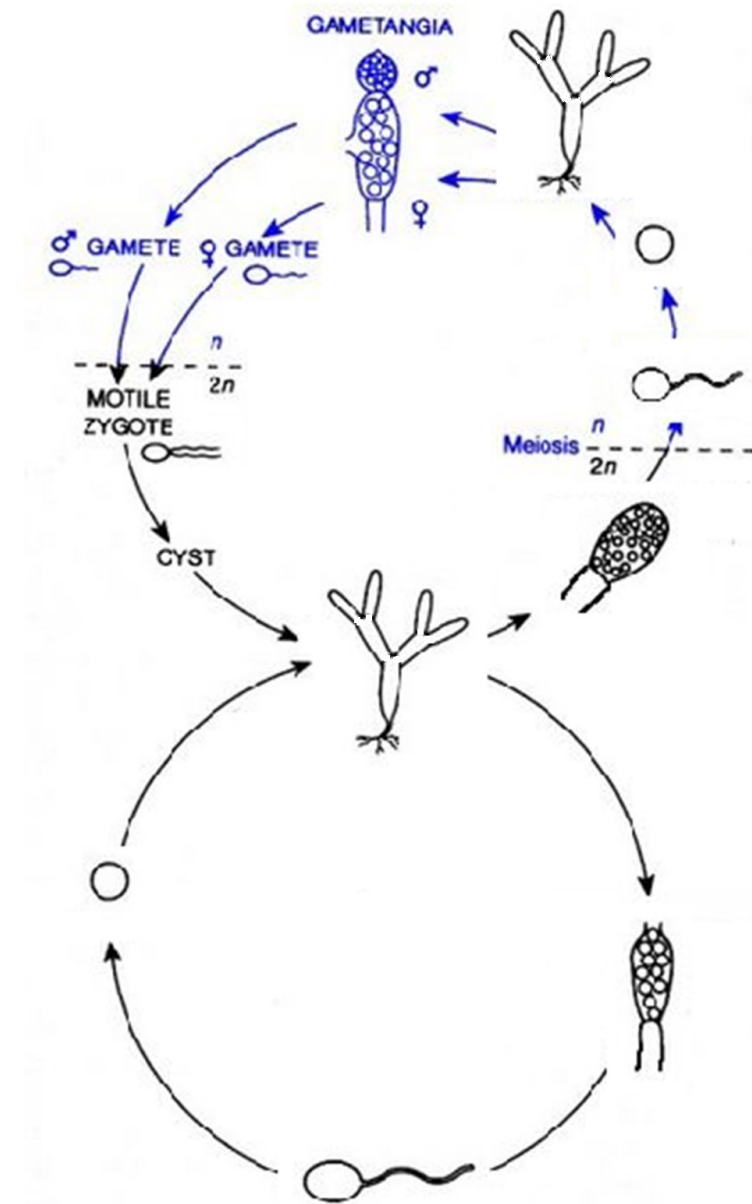
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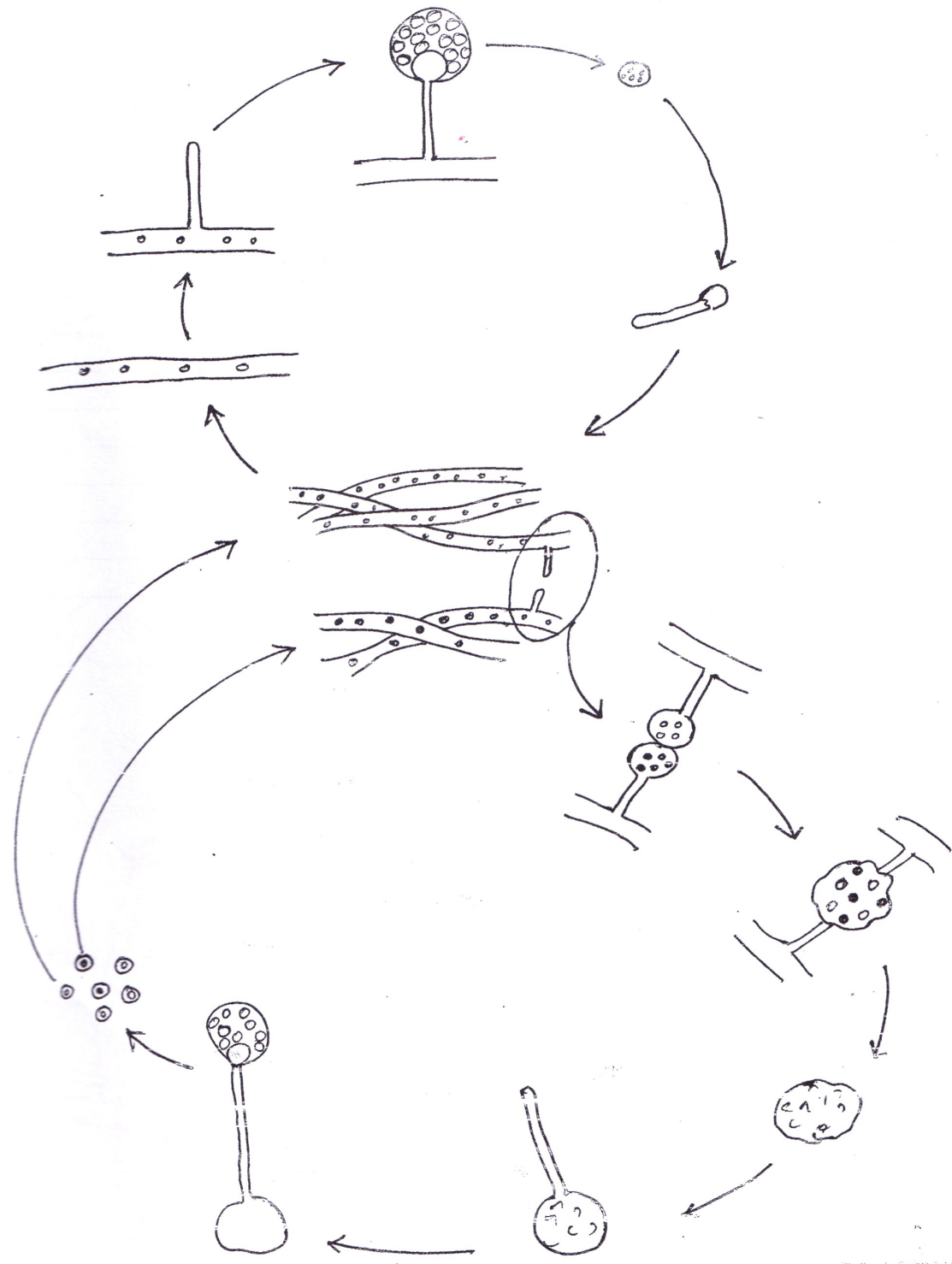
18. Compare phyla of Kingdom: Fungi

	Chytridiomycota	Zygomycota	Ascomycota	Basidiomycota
Habitat				
Septae				
Unicellular multicellular				
Flagella				
Asexual reproduction				
Sexual reproduction				
Examples				

Structured

1. What polysaccharide makes up the cell walls of fungi?
.....
2. What are the multicellular filaments formed by many fungi called?
.....
3. What is the name for fungi that lack septa and contain many nuclei?
.....
4. What specialized structures do some fungi produce to penetrate and absorb nutrients from plants?
.....
5. What is the name of the structure in Ascomycota where eight ascospores are typically produced?
.....
6. Name one example of fungi from the phylum Zygomycota.
.....
7. Which fungal phylum produces zoospores with flagella for reproduction?
.....
8. What is the dominant stage of the life cycle in Basidiomycota?
.....
9. What type of structure divides fungal hyphae into cells but still allows for movement of organelles?
.....
10. What are the three main ecological roles of fungi?
.....
11. Dominant dikaryotic stage present in
.....
12. Most advanced form of fungi
.....
13. Septae present in
.....
14. Multinucleate fungal Phyla.
.....
15. Aquatic fungi.
.....

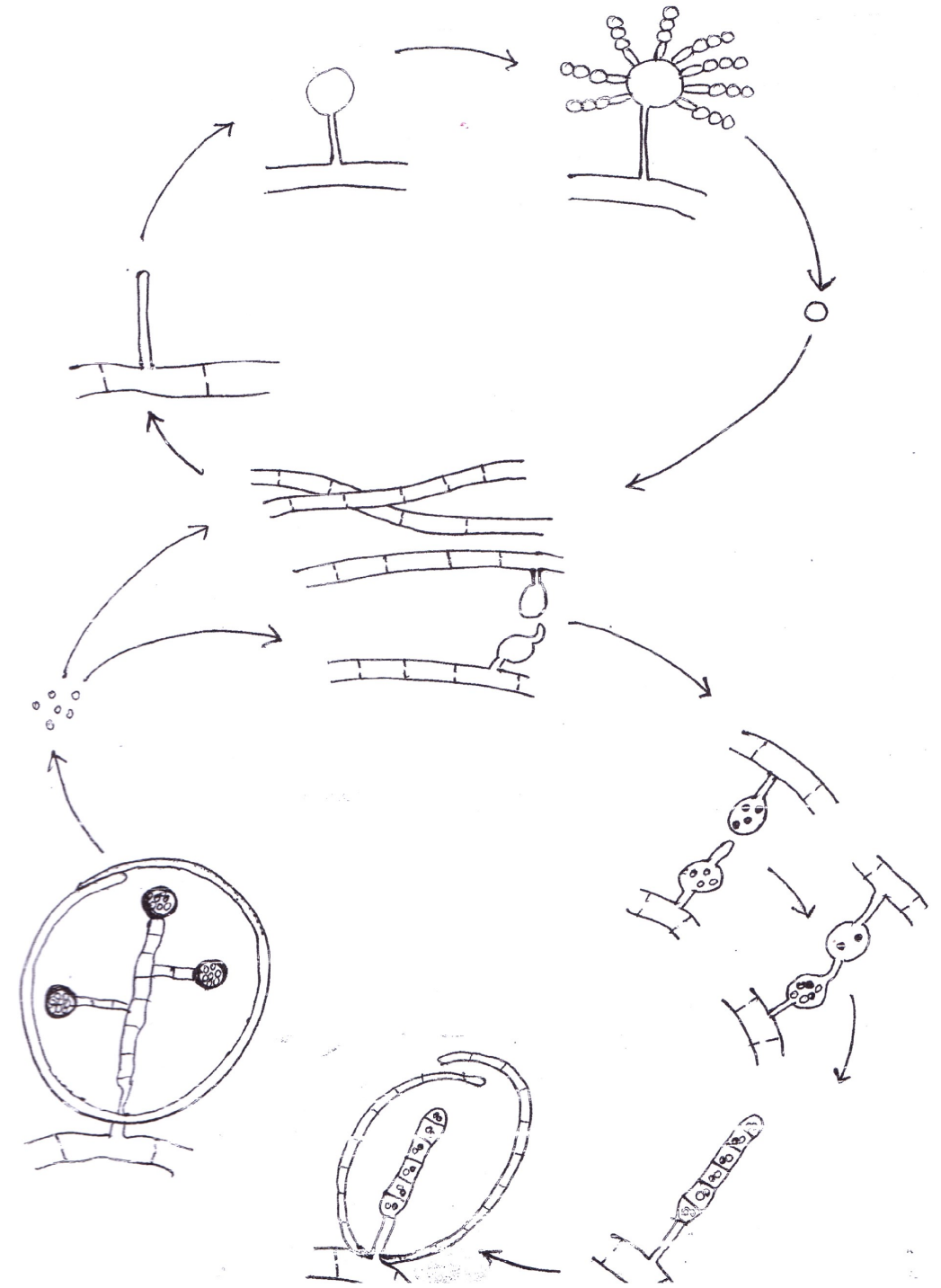




14. The network of branched hyphae adapted for absorption is called:
 (1) Mycelium (2) Sporangium (3) Ascus (4) Basidium (5) Haustorium
15. Which of these fungi has dikaryotic mycelium as the dominant stage of its life cycle?
 (1) Chytridiomycota (2) Zygomycota (3) Ascomycota (4) Basidiomycota (5) All of the above
16. Where are septa found in Zygomycota?
 (1) Throughout all hyphae (2) Only where reproductive cells are formed (3) Between all cells (4) At the tips of hyphae (5) They are not present in Zygomycota
17. Which of these is an example of Basidiomycota?
 (1) Mucor (2) Aspergillus (3) Chytridium (4) Agaricus (5) Saccharomyces
18. In asexual reproduction, Ascomycota produces conidia:
 (1) Endogenously within hyphae (2) Exogenously at the tip of conidiophores (3) Within asci (4) On basidia (5) Within sporangia
19. Which structure is produced during sexual reproduction in Zygomycota?
 (1) Ascus (2) Basidium (3) Sporangium (4) Zygosporangium (5) Conidiophore
20. Which of these is NOT a common characteristic of Kingdom Fungi?
 (1) Eukaryotic (2) Cell walls of chitin (3) Heterotrophic nutrition (4) Multicellular filaments called hyphae (5) Photosynthetic ability
21. Which of the following are characteristic features of Kingdom Fungi?
 (A) Cell walls made of chitin (B) Absorptive nutrition (C) Heterotrophic (D) Photosynthetic (E) Autotrophic
22. Which of these structures are found in fungi?
 (A) Hyphae (B) Septa (C) Mycelia (D) Haustoria (E) Glycogen
23. Which of these are examples of Ascomycota?
 (A) *Penicillium* (B) *Agaricus* (C) *Aspergillus* (D) *Saccharomyces* (E) *Mucor*
24. Which of these characteristics apply to Zygomycota?
 (A) Coenocytic mycelium (B) Aseptate except where reproductive cells form (C) Produce zygosporangiochore (D) Resistant to drying and freezing (E) Produces basidiospores
25. Which of these are true about fungal reproduction?
 (A) Fungi show sexual reproduction (B) Fungi show asexual reproduction (C) Ascomycota produce conidia exogenously (D) Basidiomycota produce exogenous basidiospores (E) Chytridiomycota produce zoospores

MCQs

- Which of the following describes the cell wall composition of fungi?
(1) Made of peptidoglycan (2) Made of cellulose (3) Made of chitin (4) Made of pectin (5) Made of lignin
- Fungi lacking septa are known as:
(1) Septate fungi (2) Coenocytic fungi (3) Hyphal fungi (4) Basidiomycetes (5) Aseptate organisms
- What is the primary nutritional mode of fungi?
(1) Photosynthetic (2) Chemosynthetic (3) Absorptive heterotrophic (4) Autotrophic (5) Phagocytic
- Which structure in fungal hyphae allows for movement of organelles between cells?
(1) Cell membrane (2) Septum with a hole (3) Chitin wall (4) Haustoria (5) Conidiophores
- Which ecological roles can fungi play according to the information provided?
(1) Decomposers only (2) Parasites only (3) Mutualists only (4) Decomposers, parasites or mutualists (5) Primary producers and consumers
- What type of spores are produced by Chytridiomycota for reproduction?
(1) Ascospores (2) Basidiospores (3) Sporangiospores (4) Zoospores with flagella (5) Conidia
- In Ascomycota, how many ascospores are typically produced within each ascus?
(1) Four (2) Six (3) Eight (4) Ten (5) Twelve
- Which of the following is a characteristic of Zygomycota?
(1) Produces basidia (2) Produces zoospores (3) Mycelium is coenocytic and aseptate (4) Produces eight ascospores (5) Primarily terrestrial
- What specialized structure do some fungi produce to penetrate plants?
(1) Septa (2) Zygosporangia (3) Haustoria (4) Ascocarps (5) Basidia
- Which phylum produces fruiting bodies called basidiocarps?
(1) Ascomycota (2) Basidiomycota (3) Chytridiomycota (4) Zygomycota (5) None of the above
- The resistant structure in Zygomycota that withstands drying and freezing is:
(1) Ascus (2) Basidiocarp (3) Haustorium (4) Zygosporangium (5) Mycelium
- Which of these fungi can be aquatic?
(1) Only Basidiomycota (2) Only Ascomycota (3) Only Zygomycota (4) Chytridiomycota (5) None of the above
- In sexual reproduction of Ascomycota, what structures fuse?
(1) Zoospores (2) Basidiospores (3) Sexually differentiated gametangia (4) Sporangiospores (5) Zygozoospores



PRACTICAL NO.13

- Observation of characteristic features of organisms of phyla Chytridiomycota, Zygomycota, Ascomycota and Basidiomycota

Objectives

- Students should be able to
- 1. Identify *Allomyces*, *Mucor*, *Aspergillus* and *Agaricus* using diagrams/slides /specimens,
- 2. List characteristic features of above mentioned organisms,
- 3. Record the observations.

Materials and equipment

- Diagrams/slides/specimens of *Allomyces*, *Mucor*, *Aspergillus* and *Agaricus*
- Light Microscopes
- Slides and cover slips

Instructions

- Allow students to observe the diagrams/ slides/ specimens of *Allomyces*, *Mucor*, *Aspergillus* and *Agaricus*.
- Let the students list characteristic morphological features of above mentioned organisms and identify each of them
- Let students record their observations.

Note

- Fungal growth rate is higher in dark places.
- Mycelia of *Mucor* can be obtained
 1. - by making a thin layer of moistened flour on a glass slide and keeping the slide inside a Petri dish
 2. - or by keeping moistened bread covered with a glass jar.

