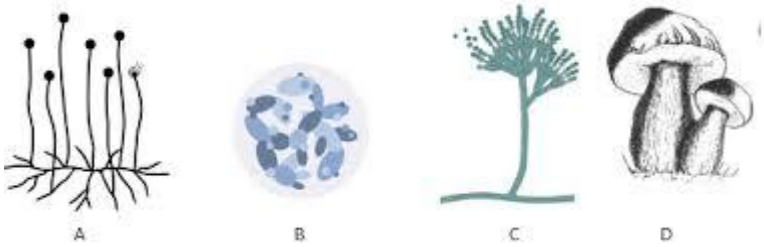
Realms of Biology

Worksheet-I Ch-2 Biological Classification

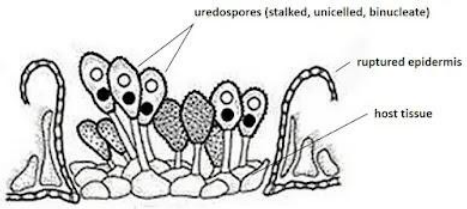
I) Multiple Choice Questions:

1. Which kingdom has members showing both autotrophic and heterotrophic modes of nutrition in a single organism?
   (a) Monera (b) Protista (c) Plantae (d) Fungi
2. Which of the following groups is correctly placed?
   (a) Agaricus – Ascomycetes (b) Rhizopus – Phycomycetes
   (c) Puccinia – Oomycetes (d) Albugo – Basidiomycetes
3. Basidiospores are produced:
   (a) Endogenously inside sporangia (b) Exogenously on club-shaped structures
   (c) Endogenously in asci (d) By binary fission of mycelium
4. Identify the organisms (A, B, C) from the given diagrams of fungi:



a)A-Mucor, B-Saccharomyces, C-Morchella, D-Amanita
b)A-Mucor, B-Saccharomyces, C-Penicillium, D-Agaricus
c)A-Rhizopus, B-Saccharomyces, C-Aspergillus, D-Morchella
d)A-Aspergillus, B-Rhizopus, C-Penicillium, D-Agaricus

5. Identify the organism shown in diagram:



(a) Rhizopus (b) Agaricus
(c) Puccinia (d) Aspergillus

6. Match the following organisms with their characteristics:

Organism	Nucleic Acid / Feature	Example Disease
i. HIV	A. ssRNA (retrovirus)	1. AIDS
ii. TMV	B. dsDNA	2. Tobacco mosaic disease
iii. Prions	C. Proteinaceous infectious	3. Mad Cow disease
iv. Pox virus	D. Infectious RNA without coat	4. Smallpox
v. Viroid	E. Naked circular RNA	5. Potato spindle tuber

Choose the correct option:
(a) i–A–1; ii–B–2; iii–C–3; iv–D–4; v–E–5 (b) i–A–1; ii–A–2; iii–C–3; iv–B–4; v–E–5
(c) i–A–1; ii–A–2; iii–E–3; iv–C–4; v–D–5 (d) i–B–2; ii–D–1; iii–C–4; iv–E–3; v–A–5

7. Which among the following has cellulose cell wall instead of chitin?
(a) Oomycetes (b) Basidiomycetes (c) Ascomycetes (d) Phycomycetes

8. Basidiospores are produced:

(a) Endogenously inside sporangia (b) Exogenously on basidia

(c) Inside asci (d) By fragmentation

II) Assertion Reason Type Questions:

9. **Assertion (A):** Archaebacteria can survive in hot springs and saline water.
   Reason (R): They have branched-chain lipids in cell membrane making them thermostable and osmotolerant.
10. **Assertion (A):** Oomycetes resemble fungi in morphology but are closer to protists in classification.
    Reason (R): Their cell wall is made up of cellulose instead of chitin.
11. **Assertion (A):** Cyanobacteria are also called "blue-green algae."
    Reason (R): They possess chlorophyll *a* and phycobiliproteins for photosynthesis.
12. **Assertion (A):** Coenocytic hyphae are characteristic of Phycomycetes.
    Reason (R): Septa are absent in their hyphae leading to continuous cytoplasm with many nuclei.
13. **Assertion (A):** Slime moulds behave like protozoans during vegetative phase.
    Reason (R): They ingest food particles by phagocytosis.
14. **Assertion (A):** Oomycetes are considered "fungus-like protists."
    Reason (R): They produce biflagellate zoospores and have cellulose wall.

III) Very Short Answer Type Questions:

15. Define Numerical taxonomy. Why is it considered more objective than classical taxonomy?
16. Give one example each of:
    (i) Oomycetes (ii) Ascomycetes (iii) Basidiomycetes (iv) Deuteromycetes
17. Name the infectious agents responsible for:
    (i) Mad Cow disease (ii) Tobacco mosaic disease
    (iii) Potato spindle tuber disease (iv) Citrus canker
18. Differentiate between **coenocytic hyphae** and **septate hyphae** with one example of each.
19. Write two economic importance of Cyanobacteria.
20. Differentiate between Viroids and Prions.
21. Describe the structure of Mycoplasma. Why are they called "PPLO"?
22. Draw a neat, labeled diagram of the life cycle of Rhizopus. Mention:
    (i) Asexual spores (ii) Sexual spores (iii) Type of hyphae
23. Compare **Archaebacteria and Eubacteria** on the basis of:
    (i) Cell wall structure (ii) Habitat (iii) Examples
24. A scientist collected samples of four organisms: Agaricus, Mucor, Albugo, and Puccinia.
    (a) Assign each organism to its correct fungal group.
    (b) Write one distinguishing reproductive feature of each group.

IV) Short Answer Type Questions:

25. Write a short note on **Cytotaxonomy** and explain its importance in evolutionary studies.
26. Rhizopus belongs to which subgroup of fungi? Mention two characteristic features of this group.
27. Compare **Archaebacteria and Eubacteria** on the basis of:
    (i) Cell wall composition (ii) Mode of nutrition (iii) Examples

28. Distinguish between the following with examples:
(i) Ascospores and Basidiospores (ii) Conidia and Zoospores

V) Case Study Based Questions:

29. Case Study 1: In a fungal culture experiment, students grew two different specimens in controlled conditions.

- **Specimen A** was observed to have **rapidly spreading, coenocytic hyphae** without cross walls. It reproduced asexually inside sporangia, releasing thousands of sporangiospores at a time. Sexual reproduction occurred by fusion of gametangia.
- **Specimen B** showed **septate mycelium** and during maturity produced a large, visible **fruiting body**. Its sexual spores developed on club-shaped structures that projected outwards. The fruiting body also played a major role in soil nutrient cycling.

Questions:

(a) Identify Specimen A and B with one example each.
(b) Are basidiospores produced endogenously or exogenously? Explain.
(c) Mention one economic importance of each class.
(d) Name the subgroup of fungi to which **Rhizopus** belongs.

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30. Case Study 2 : During a taxonomy survey in agricultural fields, two samples were collected from infected plants.

- **Sample A** had a **cellulose-rich cell wall**, produced **biflagellate zoospores**, and was responsible for **white rust in crucifers**. Farmers reported significant yield loss in mustard crops due to this pathogen.
- **Sample B** produced sac-like structures each containing **8 spores**. This fungus was parasitic on rye plants, causing **ergot disease**, leading to toxic alkaloids that affected animals and humans who consumed contaminated flour.

Questions:

(a) Identify A and B with their groups.
(b) Mention one economic loss/disease caused by each.
(c) Which one of the two samples (A or B) is closer to algae in terms of cell wall composition? Give reason.
(d) Name one more example of **Oomycetes** other than Sample A.

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31. Case Study 3: While exploring a damp forest floor after rainfall, a group of biology students observed unusual organisms.

- During their **vegetative phase**, these organisms formed a multinucleated **plasmodium**, creeping slowly with streaming protoplasm, engulfing bacteria and organic matter.
- As dry conditions developed, they aggregated and produced **spore-bearing structures** with cellulose walls. These spores could survive for long periods until favourable conditions returned.
- The organisms were later seen to contribute significantly to the decomposition of leaf litter and recycling of nutrients back into the ecosystem.

Questions:

(a) Justify why slime moulds are called “kingdom border organisms.”
(b) How do they resemble protozoa in one phase and fungi in another?

(c) What ecological role do slime moulds play in forest ecosystems?
(d) Why are slime moulds considered important models in studying **cellular communication and differentiation**?

VI) Long Answer Type Questions:

32. Describe the **five-kingdom classification of R.H. Whittaker** with criteria used. Highlight two merits and two drawbacks of this system.
33. Explain the **characteristic features of fungi**. Describe in detail:
    (i) Oomycetes (ii) Ascomycetes (iii) Basidiomycetes (iv) Deuteromycetes
    (v) Zygomycetes
34. Compare **Monera, Protista, and Fungi** with respect to:
    (i) Cell type and wall (ii) Nutrition (iii) Reproduction (iv) Economic importance
35. Archaebacteria are called "living fossils." Classify them into three groups with adaptive features and one example each.
36. Viruses blur the line between living and non-living. Justify with:
    (i) Structural details (ii) Replication mechanism (iii) Role as pathogens in plants & animals
37. Write short explanatory notes on:
    (a) Coenocytic mycelium vs Septate mycelium (b) Endogenous vs Exogenous spore formation
    (c) Importance of lichens as bioindicators
38. (a) Explain two industrial uses of diatomaceous earth obtained from diatoms.
    (b) What causes red tides and how it become harmful for aquatic organisms and humans?
    (c) Name the pigment responsible for bioluminescence in *Noctiluca* and state its ecological advantage.
    (d) Classify *Plasmodium vivax*, *Paramecium*, *Amoeba*, and *Trypanosoma* into their respective protozoan groups with one feature of each group.