CHAPTER 7 : PROTISTS & FUNGI
EXERCISE : SHORT QUESTION AND ANSWER

Q1) How do dinoflagellates differ from other algae in terms of their locomotion methods ?

Dinoflagellates use two flagella for locomotion: one wraps around the body in a groove, and the other extends backward, enabling spinning and forward movement. This is distinct from other algae, which may use a single flagellum, cilia, or rely on water currents. Their unique movement contributes to their role in planktonic ecosystems.

Q2) List the key components found in the cell structures of protozoa.

Protozoa are unicellular eukaryotic organisms. Key cell components include a plasma membrane, nucleus, cytoplasm, mitochondria for energy, and sometimes contractile vacuoles for osmoregulation. They may also have specialized organelles like pseudopodia, cilia, or flagella for locomotion.

Q3) What distinguishes foraminifera and actinopods from other marine protozoa, and where are their protective shells found ?

Foraminifera and actinopods are distinguished by their intricate shells made of calcium carbonate or silica, respectively. These shells are often found in marine sediments, contributing to the formation of limestone and other geological features. Their thin, thread-like pseudopodia extend through shell pores for feeding and locomotion.

Q4) Where in the life cycle of plasmodial slime molds are sporangia typically produced, and what is their role ?

Sporangia in plasmodial slime molds are produced during the reproductive stage when environmental conditions become unfavorable. They release spores, which germinate under suitable conditions to form new slime mold colonies. This ensures the survival and propagation of the organism.

Q5) What sets brown algae apart from other multicellular algae, and where are kelps commonly found ?

Brown algae (Phaeophyceae) are distinguished by their large size, brown pigment (fucoxanthin), and complex body structures like holdfasts, stipes, and blades. Kelps, a type of brown algae, are commonly found in cold, nutrient-rich coastal waters and form underwater forests.

Q6) How do euglenoids differ from other freshwater organisms in terms of their nutritional strategies ?

Euglenoids are mixotrophic, capable of both photosynthesis using chloroplasts and heterotrophic feeding by engulfing food particles. This dual ability allows them to survive in varying light and nutrient conditions, giving them a significant ecological advantage in freshwater habitats.

Q7) List three examples of parasitic protozoa that infect humans.

Q8) How do choanoflagellates stand out from other flagellate organisms, and what is their structural resemblance to?

Choanoflagellates are unique due to their collar-like structure surrounding a single flagellum. This structure closely resembles the choanocytes (collar cells) of sponges, suggesting an evolutionary link between choanoflagellates and multicellular animals.

Q9) Where in the life cycle of red algae are holdfasts found, and how do they anchor these multicellular organisms?

Holdfasts in red algae are found at the base of the thallus and serve to anchor the algae to rocks or other substrates. These structures are critical in turbulent marine environments, providing stability while allowing the algae to grow and photosynthesize.

Q10) List four different types of locomotion methods used by protists and give an example of a protist that employs each method.

1. **Flagellar movement:** Seen in *Euglena*.
2. **Ciliary movement:** Seen in *Paramecium*.
3. **Amoeboid movement:** Seen in *Amoeba*.
4. **Passive movement:** Seen in sporozoans like *Plasmodium* (carried by host or vector).

Q11) What characterizes the life cycle of oomycetes, and where are swimming zoospores typically generated?

Oomycetes, also known as water molds, have a life cycle involving both sexual and asexual reproduction. Swimming zoospores are generated in sporangia during the asexual stage. These zoospores are flagellated, enabling them to disperse in water and infect new hosts.

Q12) what are primary modes of obtaining nutrients in fungi?

Fungi are heterotrophic and obtain nutrients by absorption. Modes include:

1. **Saprophytic:** Feeding on dead organic matter.
2. **Parasitic:** Feeding on living hosts, causing diseases.
3. **Mutualistic:** Forming beneficial associations, like mycorrhizae with plant roots.

Q13) Where can fungi be found in various ecosystems, and what are their diverse habitats?

Fungi are found in soil, water, decaying matter, and as symbionts on plants and animals. They inhabit forests, wetlands, deserts, and even extreme environments like Arctic regions. Their diverse habitats reflect their ecological roles as decomposers, pathogens, and mutualistic partners.

Q14) Why are fungi considered heterotrophic, and what are their diverse habitats?

Fungi lack chlorophyll and cannot photosynthesize, making them heterotrophic. They absorb nutrients from organic sources, living or dead. Fungi thrive in soil, aquatic habitats, decaying matter, and as symbionts on plants and animals, showcasing their adaptability.

Q16) Name the four major groups of fungi based on their methods of reproduction.

I. **Zygomycota:** Form zygospores.
II. **Ascomycota:** Produce ascospores in asci.
III. **Basidiomycota:** Form basidiospores on basidia.
IV. **Chytridiomycota:** Produce flagellated spores.

Q17) What makes imperfect fungi unique, and why are they sometimes referred to as "imperfect"?

Imperfect fungi lack a sexual reproductive stage, distinguishing them from other fungal groups. They are termed "imperfect" because their sexual forms, if they exist, have not been observed.

Q18) What is “zygospores” and how is it formed?

Zygospores are thick-walled, resistant spores formed during the sexual reproduction of zygomycete fungi. They develop when two compatible hyphae fuse, creating a zygote that undergoes meiosis to produce spores.

Q19) What is “histoplasmosis”?

Histoplasmosis is a fungal infection caused by *Histoplasma capsulatum*. It primarily affects the lungs and is contracted by inhaling spores from soil contaminated with bird or bat droppings.

Q20) If a new deadly fungicide destroys all fungi, what would be the impact?

The extinction of fungi would disrupt ecosystems by halting decomposition, nutrient cycling, and plant-fungal symbioses like mycorrhizae. Agricultural productivity would decline, and many species dependent on fungi for survival would face extinction.

Q21) Do the terms “dikaryotic” and “diploid” have the same meaning?

No, “dikaryotic” refers to cells with two distinct nuclei from different parents, while “diploid” refers to cells with a single nucleus containing two sets of chromosomes.

Q22) How do fungi store carbohydrates?

Fungi store carbohydrates in the form of **glycogen**, similar to animals. Glycogen is a polysaccharide composed of glucose units that fungi can readily break down when they need energy. Unlike plants, which store carbohydrates as starch, fungi do not possess the enzymes required for starch synthesis. The glycogen storage occurs in the fungal cytoplasm, where it serves as an energy reserve for growth, reproduction, and survival during periods of nutrient scarcity

Q23) Name the four major groups of fungi based on their methods of reproduction.

I. **Zygomycota:** Produce zygospores.
II. **Ascomycota:** Form ascospores in sac-like asci.
III. **Basidiomycota:** Produce basidiospores on basidia.
IV. **Chytridiomycota:** Generate motile zoospores

Feature	Endomycorrhiza	Ectomycorrhiza
Location	Inside plant root cells	Around plant root cells
Fungal structure	Forms arbuscules	Forms a fungal sheath
Plant partners	Found in most plants	Common in trees (e.g., pines)
Nutrient exchange	Occurs directly in cells	Occurs in intercellular spaces
Examples	*Glomus* species	*Amanita* species

Q24) Write two salient features of the following:

Ans)

Coenocytic hyphae:

- Coenocytic hyphae are multinucleate, meaning they have many nuclei within a single cell, without any septa (divisions) between them.
- These hyphae are typically found in the group of fungi called Zygomycota, such as *Rhizopus*, and allow for the efficient flow of nutrients across the fungal body.

Conidia:

- Conidia are asexual, non-motile spores produced by fungi, typically by structures called conidiophores.
- They are released into the air or water and can germinate to form new fungal colonies, playing a key role in fungal reproduction and dispersal.

Ascocarp:

- An ascocarp is the fruiting body of an ascomycete fungus, containing asci (sac-like structures) in which sexual spores (ascospores) are produced.
- The ascocarp can be a variety of shapes and sizes, including cup-like or spherical, and is important for sexual reproduction in ascomycetes like *Neurospora*.

Sporangia:

- Sporangia are structures that produce and release asexual spores, often in large numbers.
- Found in fungi like Zygomycota and some Chytridiomycota, sporangia are important for the rapid spread and reproduction of the fungus in suitable environments.

Basidium:

- A basidium is a club-shaped structure found in basidiomycetes, such as mushrooms, that produces sexual spores known as basidiospores.
- The basidium forms as part of the sexual cycle of the fungi, and the basidiospores are released to form new fungal individuals.

Q25) List two differences between fungal cell walls and plant cell walls.

Characteristic	Fungal Cell Walls	Plant Cell Walls
Composition	Fungal cell walls contain **chitin**, a tough polysaccharide made of N-acetylglucosamine.	Plant cell walls contain **cellulose**, a carbohydrate made up of glucose units that provide structural support.
Function	The cell wall of fungi provides rigidity and protection from environmental stress, but also allows flexibility for growth.	Plant cell walls provide rigidity and support, enabling plants to stand upright and withstand physical stress.