

NEET • CLASS 11 BIOLOGY • CHAPTER 2

Biological Classification — Revision Sheet

The five-kingdom system, Monera, Protista, Fungi, viruses, viroids and lichens — the facts NEET asks again and again.

Quick NCERT recap

- Whittaker's 5 kingdoms: Monera, Protista, Fungi, Plantae, Animalia — based on cell structure, body organisation, nutrition, reproduction and phylogeny.
- Monera: Archaeobacteria (extreme habitats, no peptidoglycan) and Eubacteria (cyanobacteria, mycoplasma).
- Protista: Chrysophytes (diatoms), Dinoflagellates (red tides), Euglenoids, Slime moulds, Protozoans.
- Fungi: Phycomycetes, Ascomycetes (ascospores), Basidiomycetes (basidiospores), Deuteromycetes (imperfect).
- Viruses, viroids and lichens are acellular or symbiotic edge-cases outside the five kingdoms.

Exam tips

- Learn one distinguishing feature per group — that is how most NEET options are framed.
- Mycoplasma (no cell wall) and Archaeobacteria (no peptidoglycan) are repeat favourites.
- Match example organisms to their group: Gonyaulax, Nostoc, Claviceps, Neurospora.

Practice questions with answers

Q1. Whittaker's five-kingdom classification is based primarily on which set of criteria?

(A) Habitat, reproduction, and locomotion

✓ (B) Cell structure, body organisation, mode of nutrition, reproduction, and phylogenetic relationships

(C) Only mode of nutrition and reproduction

(D) Genetic similarity and DNA sequence alone

Answer: (B) Cell structure, body organisation, mode of nutrition, reproduction, and phylogenetic relationships

Why: R. H. Whittaker (1969) proposed the five-kingdom system — Monera, Protista, Fungi, Plantae, Animalia — using cell structure (prokaryotic vs eukaryotic), body organisation (unicellular vs multicellular), mode of nutrition (autotrophic, heterotrophic — absorptive vs ingestive), reproduction, and phylogenetic relationships as the main criteria.

Q2. Which of the following is NOT a characteristic of Archaeobacteria?

- ✓ (A) They possess peptidoglycan in their cell walls
- (B) They live in extreme habitats such as salt pans and hot springs
- (C) Their cell membrane contains branched chain lipids
- (D) Methanogens are archaeobacteria found in the gut of ruminants

Answer: (A) They possess peptidoglycan in their cell walls

Why: Archaeobacteria lack peptidoglycan (murein) in their cell walls — a key difference from eubacteria. Their walls contain pseudopeptidoglycan or protein layers, and their membranes have branched-chain lipids that resist extreme temperature/pH. Methanogens, halophiles, and thermoacidophiles are the three main groups.

Q3. Mycoplasma differ from all other prokaryotes because they:

- (A) Lack a nucleus
- ✓ (B) Completely lack a cell wall
- (C) Cannot cause disease in animals
- (D) Contain 80S ribosomes

Answer: (B) Completely lack a cell wall

Why: Mycoplasma are the smallest living cells known and are the only prokaryotes that completely lack a cell wall. This makes them pleomorphic and resistant to cell-wall targeting antibiotics like penicillin. They can survive without oxygen (many are anaerobic) and cause diseases in animals and plants.

Q4. The 'red tides' in the sea are caused by rapid multiplication of:

- (A) Diatoms
- (B) Euglenoids
- ✓ (C) Dinoflagellates such as Gonyaulax
- (D) Slime moulds

Answer: (C) Dinoflagellates such as Gonyaulax

Why: Red tides are caused by red dinoflagellates (e.g., Gonyaulax) that multiply so rapidly the sea appears red. Toxins released by these dinoflagellates can kill fish and other marine animals. Dinoflagellates are photosynthetic Protists with two flagella — one longitudinal and one transverse.

Q5. Diatomaceous earth is formed from the accumulated:

- (A) Cell walls of dinoflagellates
- ✓ (B) Silica-rich cell walls (frustules) of diatoms
- (C) Chitinous walls of fungi
- (D) Calcareous shells of foraminiferans

Answer: (B) Silica-rich cell walls (frustules) of diatoms

Why: Diatoms have indestructible cell walls made of two overlapping shells (frustules) that fit together like a soap-box, embedded with silica. Over billions of years, their accumulated cell walls formed 'diatomaceous earth', which is used in polishing, filtration of oils and syrups.

Q6. Which of the following pairs is correctly matched with respect to fungi?

- (A) Phycomycetes — sexual spores called ascospores
- ✓ (B) Ascomycetes — sac fungi, sexual spores are ascospores produced in asci
- (C) Basidiomycetes — coenocytic hyphae
- (D) Deuteromycetes — sexual reproduction is well known

Answer: (B) Ascomycetes — sac fungi, sexual spores are ascospores produced in asci

Why: Ascomycetes (sac fungi) — e.g., *Aspergillus*, *Claviceps*, *Neurospora* — produce sexual spores called ascospores endogenously in sac-like asci. Phycomycetes have coenocytic hyphae and produce zoospores/aplanospores. Basidiomycetes produce basidiospores exogenously on basidia. Deuteromycetes ('fungi imperfecti') lack a known sexual stage.

Q7. Viroids differ from viruses in that viroids:

- (A) Have a protein coat but no nucleic acid
- ✓ (B) Consist of free RNA without a protein coat, of lower molecular weight than viral RNA
- (C) Contain DNA and protein coat
- (D) Are larger than viruses

Answer: (B) Consist of free RNA without a protein coat, of lower molecular weight than viral RNA

Why: Viroids were discovered by T. O. Diener (1971) as the causal agent of potato spindle tuber disease. They consist of free, low-molecular-weight RNA without a protein coat — smaller than viruses. Viruses always have a nucleic acid (DNA or RNA) enclosed in a protein capsid.

Q8. Lichens represent a symbiotic association between:

- (A) Two fungi
- ✓ (B) An alga (phycobiont) and a fungus (mycobiont)
- (C) A bacterium and a fungus
- (D) A moss and an alga

Answer: (B) An alga (phycobiont) and a fungus (mycobiont)

Why: Lichens are symbiotic (mutualistic) associations between an alga (phycobiont — usually a green alga or cyanobacterium) that prepares food by photosynthesis, and a fungus (mycobiont — usually an ascomycete) that provides shelter and absorbs mineral nutrients and water. Lichens are excellent pollution indicators — they don't grow in polluted areas.

Q9. Which of the following statements about *Euglena* is INCORRECT?

- (A) It has a protein-rich layer called pellicle instead of a cell wall
- (B) It is a photosynthetic protist in sunlight and heterotrophic in the absence of light
- (C) It has two flagella, a short and a long one
- ✓ (D) It reproduces exclusively by sexual reproduction

Answer: (D) It reproduces exclusively by sexual reproduction

Why: Euglenoids like *Euglena* reproduce by longitudinal binary fission (asexual reproduction) — sexual reproduction is not known. They are 'mixotrophic' — photosynthetic in light and heterotrophic when deprived of sunlight. The flexible pellicle (made of proteins) replaces a cell wall, allowing them to change shape.

Q10. The bacteria Nostoc and Anabaena are important in agriculture because they:

- (A) Decompose organic matter faster than any other organism
- ✓ (B) Fix atmospheric nitrogen in specialised cells called heterocysts
- (C) Kill harmful soil fungi
- (D) Produce antibiotics used in crop protection

Answer: (B) Fix atmospheric nitrogen in specialised cells called heterocysts

Why: Nostoc and Anabaena are filamentous cyanobacteria (blue-green algae) that fix atmospheric nitrogen in specialised, thick-walled cells called heterocysts. This makes them important biofertilisers in paddy fields. Cyanobacteria have chlorophyll a and are photosynthetic; some also form symbiotic associations (e.g., Anabaena in Azolla).

Revise this chapter on the right day

Study Commander AI reminds you to revise each topic on day 1, 3, 8 and 20, so you do not forget what you already learnt. Take the free 10-question test for this chapter:

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