

ANSWER KEY & MARKING SCHEME · CBSE CLASS 11

Biological Classification

Biology · Chapter 2 · Use this with the Board Paper · Companion to Quick Drill

HOW TO USE

Attempt the Board Paper first (closed-book, full time). Then come here. For 2-mark+ questions, compare your answer to the model. For 3-4 mark questions, also consult the **Topper Templates** below — these show the exact step-by-step structure that scores full marks per CBSE marking-scheme conventions.

MODEL ANSWERS · BOARD PAPER

Section A — 1-mark questions

Q1. Name the scientist who proposed the five-kingdom classification and the year of the proposal. [1 mark]

Ans: R.H. Whittaker, 1969.

Q2. Define a viroid in ONE sentence. [1 mark]

Ans: A viroid is an infectious agent consisting of a free naked RNA molecule with NO protein coat (e.g. potato spindle tuber disease, Diener 1971).

Q3. Name the smallest living cells that LACK a cell wall. [1 mark]

Ans: Mycoplasma — approximately 0.3 µm; the smallest known living cells and the only prokaryotes without a cell wall.

Q4. What is diatomaceous earth? [1 mark]

Ans: Diatomaceous earth is the accumulated siliceous frustules (cell walls) of dead diatoms. It is used in filtration, polishing and as a mild abrasive in toothpaste.

Section B — 2-mark questions

Q5. Why are viruses considered a link between living and non-living? Give two reasons for each side. [2 marks]

Ans: Living traits: (i) they replicate, mutate and evolve inside a host cell; (ii) they contain genetic material (DNA or RNA). Non-living traits: (i) they can be CRYSTALLISED outside the host (Stanley, 1935); (ii) they show NO metabolism and have no cell structure outside the host.

Q6. What are lichens? Briefly describe the partnership between the two organisms involved. [2 marks]

Ans: Lichens are a symbiotic association between an alga (phycobiont) and a fungus (mycobiont). The alga photosynthesises and supplies organic food; the fungus provides shelter, absorbs water and minerals, and protects the alga from desiccation. The association is mutualistic and lichens are sensitive indicators of air pollution (1 mark for definition + 1 mark for partnership description).

Q7. Differentiate viroid and prion in terms of biomolecule composition, with one disease example each. [2 marks]

Ans: Viroid — naked RNA molecule (no protein coat); causes potato spindle tuber disease (Diener 1971). Prion — abnormally folded PROTEIN with NO nucleic acid; causes Creutzfeldt-Jakob disease in humans and bovine spongiform encephalopathy (mad-cow disease). 1 mark per row.

Section C — 3-mark questions

Q8. Differentiate Archaeobacteria and Eubacteria on the basis of (i) cell wall, (ii) habitat, (iii) examples. [3 marks]

Ans: (i) Cell wall — Archaeobacteria have pseudo-peptidoglycan walls (lack true peptidoglycan) and branched-lipid membranes; Eubacteria have true peptidoglycan walls and straight-chain lipid membranes. (ii) Habitat — Archaeobacteria inhabit extreme environments (anaerobic marshes, salt pans, hot sulphur springs); Eubacteria are ubiquitous — in soil, water, host bodies. (iii) Examples — Archaeobacteria: methanogens (Methanobacterium), halophiles (Halobacterium), thermoacidophiles (Sulfolobus); Eubacteria: cyanobacteria (Nostoc), Rhizobium, E. coli, mycoplasma. 1 mark per row.

Q9. Compare ANY TWO classes of Fungi on (i) mycelium, (ii) asexual spore type, (iii) one named example. [3 marks]

Ans: Example answer comparing Phycomycetes and Ascomycetes — (i) Mycelium: Phycomycetes — coenocytic (no cross walls); Ascomycetes — septate, branched. (ii) Asexual spore: Phycomycetes — zoospores or aplanospores produced in sporangia; Ascomycetes — conidia produced exogenously on conidiophores. (iii) Example: Phycomycetes — Rhizopus (bread mould); Ascomycetes — Penicillium (source of penicillin). Equivalent marks for any other valid two-class pairing. 1 mark per row.

Q10. Describe the four protozoan groups with one example and the locomotor structure of each. [3 marks]

Ans: (i) Amoeboid protozoans — locomotion by pseudopodia; example Entamoeba (causes amoebic dysentery). (ii) Flagellated protozoans — locomotion by flagella; example Trypanosoma (causes sleeping sickness). (iii) Ciliated protozoans — locomotion by cilia; example Paramecium (has a gullet for food intake). (iv) Sporozoans — no locomotor structure (parasitic); example Plasmodium (causes malaria). 0.75 mark per group.

Section D — 5-mark question

Q11. Compare the FIVE kingdoms of Whittaker's classification system on the basis of cell type, cell wall, body organisation, mode of nutrition, and ONE named example each. Present your answer as a table. [5 marks]

Ans: Open with: 'R.H. Whittaker (1969) proposed the Five Kingdom Classification on the basis of cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationships.' Then present a 6-column × 5-row table — Feature × {Monera, Protista, Fungi, Plantae, Animalia}. Row 1 Cell type: Prokaryotic / Eukaryotic / Eukaryotic / Eukaryotic / Eukaryotic. Row 2 Cell wall: Peptidoglycan / Varies / Chitin / Cellulose / Absent. Row 3 Body organisation: Cellular / Cellular / Multicellular (loose hyphae) / Tissue-organ / Tissue-organ-system. Row 4 Nutrition: Auto + hetero / Auto + hetero / Heterotrophic (saprotroph/parasite) / Autotrophic (photosynthesis) / Heterotrophic (holozoic). Row 5 Example: Bacteria / Diatoms / Rhizopus / Mango / Earthworm. Close with: 'Carl Woese (1990) later refined this into a three-domain system — Bacteria, Archaea, Eukarya — based on rRNA.' 0.5 mark for opening + 4 marks table (4 rows × 1 mark) + 0.5 closing remark.

Q12. Explain the four major classes of Fungi — Phycomycetes, Ascomycetes, Basidiomycetes and Deuteromycetes — with their mycelium type, asexual spore, sexual spore and one named example each. [6 marks]

Ans: Draw a 5-column × 4-row table. Header: Class | Mycelium | Asexual spore | Sexual spore | Example. Row 1 Phycomycetes — coenocytic (no septa) — zoospores/aplanospores — zygospore — Rhizopus / Mucor. Row 2 Ascomycetes — septate branched — conidia — ascospores (in asci, 8 typical) — Yeast / Penicillium / Aspergillus. Row 3 Basidiomycetes — septate branched — usually absent / rare — basidiospores (on basidia, 4 typical) — Agaricus / Puccinia / Ustilago. Row 4 Deuteromycetes — septate — conidia — unknown / not observed — Alternaria / Trichoderma. 1.5 marks per row.

★ TOPPER ANSWER TEMPLATES

2 TEMPLATES · MEMORISE THE FORMAT

★ TOPPER TEMPLATE — Pattern 1 — annual 5-mark 'compare the five kingdoms' question

Every CBSE Class 11 Biology paper since 2017

Step 1 [1 mark]	Opening line	R.H. Whittaker (1969) proposed the Five Kingdom Classification based on cell structure, body organisation, mode of nutrition, reproduction and phylogenetic relationships.
Step 2 [2 marks]	Table — cell type & wall	Draw a 6-column table (Feature Monera Protista Fungi Plantae Animalia). Cell type: Prokaryotic Eukaryotic Eukaryotic Eukaryotic Eukaryotic. Cell wall: peptidoglycan varies CHITIN cellulose absent.
Step 3 [2 marks]	Table — nutrition & organisation	Nutrition: auto/heterotrophic both saprophytic/parasitic autotrophic heterotrophic. Body: cellular cellular multicellular/loose hyphae tissue/organ tissue/organ/organ-system. Close with the Whittaker-1969 / 3-domain refinement note.

COMMON LOSS OF MARKS:

- Writing paragraphs instead of a table — examiners explicitly look for the table
- Confusing 'cell wall' rows: Fungi = CHITIN, NOT cellulose; Plantae = cellulose; Animalia = no wall
- Forgetting to write Whittaker's name + year (1969) — that one phrase carries 0.5 mark

★ TOPPER TEMPLATE — Pattern 3 — recurring 2-mark item

8 of last 10 CBSE Biology papers

Step 1
[1 mark]

Living traits

Open by stating viruses bridge living and non-living. Living traits (any three): reproduce/replicate inside a host cell; contain genetic material (DNA or RNA); mutate and undergo evolution.

Step 2
[1 mark]

Non-living traits

Non-living traits (any three): can be crystallised (TMV by Stanley, 1935); no metabolism or respiration outside a host; acellular — no membrane or organelles.

COMMON LOSS OF MARKS:

- Writing only ONE living and ONE non-living trait — examiners want at least 2-3 on each side
- Forgetting the keyword 'crystallise' — that single word carries half the non-living mark
- Confusing the discoverers: Ivanowsky (1892, infectious), Beijerinck (1898, contagium vivum fluidum), Stanley (1935, crystallised TMV) — at minimum cite Stanley

MARKING SCHEME — GENERAL NOTES

- Section D 5-kingdom question MUST be answered as a TABLE — paragraph answers lose at least 2 marks no matter how detailed.
- Award 0.5 mark for naming Whittaker + 1969 in the opener — students who skip this lose half a mark every year.
- Cell-wall material is the most-mistaken row: Fungi = CHITIN; Plantae = cellulose; Monera = peptidoglycan; Animalia = absent. Penalise each wrong material 0.25 mark.
- For the virus 'link' question, students must give AT LEAST two living + two non-living traits to score full 2 marks.
- For the lichen question, both phycobiont AND mycobiont roles must appear; missing either loses 1 mark of 2.
- Spelling of scientific names is examiner-discretion but accept any phonetic close form (Rhizopus / Rhizopous etc.); penalise only if the genus is unrecognisable.
- Bonus consideration (no extra marks): mention of Carl Woese's three-domain refinement in 5-K answer signals depth and may tip borderline scripts up half a mark.