

CUET · BIOLOGY · CLASS XI · CODE 304

Biological Classification

CUET unit: Diversity in Living World → Biological Classification

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 **Snapshot**

- Traces classification from Aristotle's morphology-based scheme (plants as trees/shrubs/herbs and animals by presence/absence of red blood) through Linnaeus's two-kingdom Plantae/Animalia system to Whittaker's 1969 five-kingdom system based on five criteria — cell structure, body organisation, mode of nutrition, reproduction, and phylogenetic relationships. The two-kingdom system failed to separate prokaryotes from eukaryotes, unicellular from multicellular, and photosynthetic from non-photosynthetic forms (NCERT Ch 2 opening, p. 10).
- Covers Monera (Archaeobacteria + Eubacteria, including cyanobacteria and mycoplasma), Protista (Chrysophytes, Dinoflagellates, Euglenoids, Slime moulds, Protozoans), and Fungi (Phycomycetes, Ascomycetes, Basidiomycetes, Deuteromycetes) in detail; sketches Plantae and Animalia (full treatment in Chapters 3 and 4); and closes with the acellular agents — viruses, viroids, prions — plus the lichen symbiosis.
- Introduces the three-domain system in which Monera is split into two domains (Archaea and Eubacteria) with the four eukaryotic kingdoms retained in a third domain — effectively a six-kingdom classification (NCERT p. 11).
- Stresses that mode of nutrition is **kingdom-determining**: autotrophs (cyanobacteria, plants) vs heterotrophs (animals, fungi, most protozoans) — and that fungi are **absorptive** heterotrophs while animals are **holozoic** (ingestive). Within fungi, the three-step sexual cycle — plasmogamy → karyogamy → meiosis — is itself an examinable process.
- Highlights examples NCERT specifically names: **Nostoc** and **Anabaena** (nitrogen-fixing heterocysts), **Gonyaulax** (red tides), **Euglena**, **Mucor/Rhizopus/Albugo** (Phycomycetes), **Aspergillus/Claviceps/Neurospora** and edible **morels/truffles** (Ascomycetes), **Agaricus/Ustilago/Puccinia** (Basidiomycetes), **Alternaria/Colletotrichum/Trichoderma** (Deuteromycetes), **Trypanosoma**, **Paramoecium**, **Plasmodium**.
- High-yield CUET territory: scientist-discovery pairs (Ivanowsky 1892, Beijerinck 1898, Stanley 1935, Diener 1971, Whittaker 1969), kingdom-criterion table (Table 2.1), spore-type-per-fungal-class, virus genetic material (RNA or DNA, never both), and the lichen partner roles (phycobiont autotrophic, mycobiont heterotrophic).

Detailed Notes

2.1 Core concepts

- **Historical progression:** Aristotle classified plants as trees/shrubs/herbs and animals by presence/absence of red blood; Linnaeus' Two-Kingdom system (Plantae + Animalia) failed to separate prokaryotes/eukaryotes, unicellular/multicellular, and photosynthetic/non-photosynthetic forms (NCERT Ch 2 opening, p. 10).
- **Whittaker (1969) Five Kingdoms:** Monera, Protista, Fungi, Plantae, Animalia — based on cell structure, body organisation, mode of nutrition, reproduction, and phylogenetic relationships (NCERT §intro, p. 11).
- **Three-domain system:** divides Monera into two domains, retaining the four eukaryotic kingdoms in a third domain → effectively a six-kingdom classification (NCERT p. 11).
- **Kingdom Monera (bacteria only):** prokaryotic; non-cellulosic cell wall (polysaccharide + amino acid); shapes — Coccus, Bacillus, Vibrium, Spirillum; reproduce mainly by fission, sometimes spores, and a primitive form of DNA transfer (NCERT §2.1, pp. 12–14, Fig. 2.1).
- **Archaeobacteria:** halophiles (salty), thermoacidophiles (hot springs), methanogens (marshes, gut of ruminants — produce biogas from dung); distinctive cell wall structure enables extremophile survival (NCERT §2.1.1, p. 13).
- **Eubacteria:** rigid cell wall + flagellum (if motile); includes **cyanobacteria** (blue-green algae) — photosynthetic autotrophs with chlorophyll a, may be unicellular/colonial/filamentous, gelatinous-sheathed colonies, form blooms; **heterocysts** of Nostoc and Anabaena fix atmospheric nitrogen; **chemosynthetic autotrophs** oxidise nitrates/nitrites/ammonia and recycle N, P, Fe, S; **heterotrophic eubacteria** are major decomposers — make curd, antibiotics, fix legume nitrogen; pathogens cause cholera, typhoid, tetanus, citrus canker (NCERT §2.1.2, pp. 13–14, Fig. 2.2).
- **Mycoplasma:** smallest living cells; completely lack a cell wall; survive without oxygen; many pathogenic to plants/animals (NCERT §2.1.2, p. 14).
- **Kingdom Protista — Chrysophytes:** diatoms + golden algae (desmids); microscopic plankton; silica-impregnated indestructible cell walls forming two overlapping "soap-box" shells; deposits → diatomaceous earth (polishing, filtration); chief producers in oceans (NCERT §2.2.1, p. 14).
- **Dinoflagellates:** mostly marine, photosynthetic; appear yellow/green/brown/blue/red by pigment; stiff cellulose plates; two flagella (one longitudinal, one transverse in furrow); **Gonyaulax** causes red tides whose toxins kill fish (NCERT §2.2.2, p. 15, Fig. 2.4a).
- **Euglenoids:** mostly fresh-water, stagnant pools; lack cell wall — have protein-rich **pellicle**; two flagella (one short, one long); photosynthetic in light, heterotrophic

predators in dark (mixotrophy); pigments identical to higher plants; e.g., *Euglena* (NCERT §2.2.3, p. 15, Fig. 2.4b).

- **Slime moulds:** saprophytic protists; form a multinucleate **plasmodium** that spreads over decaying matter and engulfs it; under stress form fruiting bodies with true-walled, highly resistant, air-dispersed spores (NCERT §2.2.4, p. 15, Fig. 2.4c).
- **Protozoans (4 groups):** all heterotrophic, predator/parasite; **Amoeboid** (*Amoeba*, *Entamoeba* — pseudopodia, silica shells in marine forms); **Flagellated** (*Trypanosoma* — sleeping sickness); **Ciliated** (*Paramecium* — gullet steers food via cilia); **Sporozoans** (*Plasmodium* — malaria, infectious spore-like life-cycle stage) (NCERT §2.2.5, p. 16, Fig. 2.4d).
- **Kingdom Fungi:** heterotrophic eukaryotes; mostly filamentous with **hyphae** forming a **mycelium**; **coenocytic** (multinucleate, no septa) vs septate hyphae; cell wall of **chitin + polysaccharides**; saprophytes, parasites, or **symbionts** (lichens with algae, mycorrhiza with plant roots) (NCERT §2.3, pp. 16–17).
- **Fungal reproduction:** vegetative (fragmentation/fission/budding); asexual by conidia/sporangiospores/zoospores; sexual by oospores/ascospores/basidiospores; three-step sexual cycle = **plasmogamy** → **karyogamy** → **meiosis**; ascomycetes and basidiomycetes show a **dikaryotic (n+n) phase / dikaryophase** (NCERT §2.3, p. 17).
- **Phycomycetes:** aquatic / decaying wood / obligate plant parasites; **aseptate coenocytic** mycelium; asexual = zoospores or aplanospores in sporangium; **zygospore** by fusion of isogamous/anisogamous/oogamous gametes; e.g., *Mucor*, *Rhizopus*, *Albugo* (NCERT §2.3.1, p. 17, Fig. 2.5a).
- **Ascomycetes (sac fungi):** mostly multicellular (*Penicillium*) or unicellular (*Saccharomyces*); branched, septate mycelium; asexual conidia produced exogenously on **conidiophores**; sexual **ascospores** produced endogenously in **asci** within fruiting bodies called **ascocarps**; e.g., *Aspergillus*, *Claviceps*, *Neurospora* (used in genetics), morels and truffles (edible) (NCERT §2.3.2, pp. 17–18, Fig. 2.5b).
- **Basidiomycetes:** mushrooms, bracket fungi, puffballs, rusts, smuts; branched septate mycelium; asexual spores generally absent; sex organs absent — plasmogamy by fusion of vegetative/somatic cells of different strains → dikaryotic mycelium → **basidium** where karyogamy + meiosis form four exogenous **basidiospores** on basidia arranged in **basidiocarps**; e.g., *Agaricus*, *Ustilago* (smut), *Puccinia* (rust) (NCERT §2.3.3, p. 18, Fig. 2.5c).
- **Deuteromycetes (Fungi Imperfecti):** only asexual/vegetative phases known; reproduce only by **conidia**; septate, branched mycelium; many are decomposers in mineral cycling; once sexual stage is discovered they are moved to ascomycetes/basidiomycetes; e.g., *Alternaria*, *Colletotrichum*, *Trichoderma* (NCERT §2.3.4, p. 18).
- **Kingdom Plantae:** eukaryotic, chlorophyll-containing; cellulose cell wall; includes algae, bryophytes, pteridophytes, gymnosperms, angiosperms; partially heterotrophic exceptions — insectivorous Bladderwort and Venus fly trap; parasitic

Cuscuta; life cycle shows **alternation of generations** (diploid sporophyte ↔ haploid gametophyte) (NCERT §2.4, p. 19).

- **Kingdom Animalia:** heterotrophic multicellular eukaryotes, no cell wall; **holozoic** nutrition (ingestion); food stored as glycogen/fat; elaborate sensory/neuromotor systems in higher forms; sexual reproduction by copulation + embryological development (NCERT §2.5, p. 19).
- **Viruses:** non-cellular obligate parasites; inert crystalline outside host; **Ivanowsky (1892)** linked microbes to tobacco mosaic disease; **Beijerinck (1898)** showed tobacco extract caused infection — coined "virus" / **Contagium vivum fluidum**; **Stanley (1935)** crystallised viruses, showing they consist largely of protein; genetic material is **either RNA or DNA — never both**; plant viruses usually ssRNA; animal viruses ssRNA / dsRNA / dsDNA; bacteriophages usually dsDNA; protein **capsid** of **capsomeres** (helical/polyhedral); cause mumps, smallpox, herpes, influenza, AIDS; in plants — mosaic, leaf curling, yellowing, vein clearing, stunting (NCERT §2.6, pp. 19–21, Fig. 2.6).
- **Viroids: T.O. Diener (1971)** — agent of potato spindle tuber disease; free, low-molecular-weight RNA with no protein coat — hence smaller than viruses (NCERT §2.6, p. 21).
- **Prions:** abnormally folded infectious proteins, virus-sized; cause **bovine spongiform encephalopathy (BSE, mad cow disease)** in cattle and **Creutzfeldt-Jacob disease (CJD)** in humans (NCERT §2.6, p. 21).
- **Lichens:** mutually useful symbiotic associations — **phycobiont** (autotrophic algal partner, prepares food) + **mycobiont** (heterotrophic fungal partner, gives shelter, absorbs water and minerals); excellent **pollution indicators** — do not grow in polluted areas (NCERT §2.6, pp. 21–22).

2.2 Definitions to memorise

Term	Definition	Page
Heterocyst	Specialised cell in cyanobacteria (e.g., Nostoc, Anabaena) that fixes atmospheric nitrogen	13
Mycoplasma	Smallest living cells; completely lack a cell wall; survive without oxygen	14
Diatomaceous earth	Gritty soil formed from silica-rich indestructible diatom cell walls; used in polishing/filtration	14
Pellicle	Protein-rich flexible body covering of euglenoids (in place of a cell wall)	15
Plasmodium (of slime moulds)	Multinucleate aggregation that creeps over decaying matter and engulfs organic material	15
Hypha / Mycelium	Long thread-like fungal filament / network of hyphae	16
Coenocytic hypha	Continuous, aseptate, multinucleate fungal hypha	16

Term	Definition	Page
Plasmogamy	Fusion of protoplasts of two gametes in the fungal sexual cycle	17
Karyogamy	Fusion of two nuclei following plasmogamy	17
Dikaryon / Dikaryophase	Cell with two nuclei (n+n); intervening stage in ascomycetes & basidiomycetes	17
Conidia	Asexual exogenous spores of ascomycetes/deuteromycetes, borne on conidiophores	18
Ascocarp / Basidiocarp	Fruiting bodies of ascomycetes / basidiomycetes	17- 18
Capsid / Capsomere	Protein coat of a virus / its repeating subunits	20
Viroid	Free, low-molecular-weight infectious RNA with no protein coat	21
Prion	Infectious agent of abnormally folded protein, virus-sized	21
Phycobiont / Mycobiont	Algal / fungal partner of a lichen	21
Mycorrhiza	Symbiotic association of a fungus with roots of higher plants	16
Cyanobacteria	Photosynthetic prokaryotes with chlorophyll a; unicellular/ colonial/filamentous; may form gelatinous-sheathed blooms in polluted water	13
Methanogens	Archaeobacterial group inhabiting marshy areas and ruminant gut; produce methane (biogas) from cattle dung	13
Halophiles	Salt-loving archaeobacteria	13
Thermoacidophiles	Archaeobacteria of hot springs (high temperature + acidic conditions)	13
Heterocyst	Specialised nitrogen-fixing cell of certain cyanobacteria (Nostoc, Anabaena)	13
Chemosynthetic autotrophs	Bacteria that oxidise inorganic substances (nitrates, nitrites, ammonia) for ATP, recycling N, P, Fe, S	13
Bacterial shapes	Coccus (spherical), Bacillus (rod), Vibrium (comma-shaped), Spirillum (spiral)	12
Diatomaceous earth	Gritty soil deposited from indestructible silica diatom walls; used in polishing/filtration/oil filtering	14
Red tide	Sea-reddening bloom of dinoflagellates (e.g., Gonyaulax) whose toxins can kill fish	15
Holozoic nutrition	Ingestive heterotrophic nutrition characteristic of animals	19
Capsid / Capsomere	Protein coat of a virus / its repeating protein subunits arranged in helical or polyhedral geometry	20

Term	Definition	Page
Bacteriophage	Bacterial virus, generally double-stranded DNA, with head, sheath, tail fibres	20
TMV	Tobacco Mosaic Virus — single-stranded RNA in a helical capsid; first crystallised by Stanley (1935)	20
Alternation of generations	Plant life cycle with alternating diploid sporophytic and haploid gametophytic phases	19

2.3 Diagrams / processes to remember

- **Figure 2.1, p. 12:** Bacterial shapes — Cocci, Bacilli (with spore), Spirilla (with flagellum), Vibrio.
- **Figure 2.2, p. 13:** Filamentous blue-green alga **Nostoc** showing heterocyst and mucilaginous sheath.
- **Figure 2.3, p. 14:** A dividing bacterium showing cell wall, cell membrane, and DNA.
- **Figure 2.4, pp. 15–16:** (a) Dinoflagellate (with cellulose plates), (b) **Euglena** (two flagella + pellicle), (c) slime mould, (d) **Paramecium** (cilia + gullet).
- **Figure 2.5, p. 17:** Fungi — (a) **Mucor** (Phycomycetes), (b) **Aspergillus** (Ascomycetes), (c) **Agaricus** (Basidiomycetes).
- **Figure 2.6, p. 20:** (a) TMV — RNA inside helical capsid; (b) Bacteriophage with head, collar, sheath, tail fibres.
- **Table 2.1, p. 11:** Five-kingdom comparison across cell type, cell wall, nuclear membrane, body organisation, mode of nutrition.
- **Fungal sexual cycle:** plasmogamy → karyogamy → meiosis (p. 17).

2.4 Common confusions / NTA trap points

- **Mycoplasma vs Archaeobacteria:** Mycoplasma have **no cell wall at all**; archaeobacteria have a **different** (not absent) cell wall. NTA often swaps these descriptions.
- **Diatom wall vs Dinoflagellate wall:** diatom walls are **silica** (overlapping soap-box shells), dinoflagellate walls are **stiff cellulose plates** — frequently confused.
- **Euglena's pellicle is protein**, not cellulose — and Euglena has **no cell wall**, despite being "plant-like" in pigments.
- **Coenocytic = aseptate (Phycomycetes only)**; ascomycetes/basidiomycetes/deuteromycetes have **septate** mycelium — a classic match-the-class trap.
- **Spore types per class:** Phycomycetes → zoospores/aplanospores/zygospores; Ascomycetes → conidia + ascospores; Basidiomycetes → basidiospores (asexual spores generally absent); Deuteromycetes → conidia only. Many MCQs test this exact mapping.
- **Conidia exogenous, ascospores endogenous** — direction trap.

- **No virus has both RNA and DNA** — a frequent absolute-statement MCQ. Plant viruses are usually ssRNA; bacteriophages dsDNA.
- **Scientist trap (often tested):** Ivanowsky (1892) → recognised tobacco-mosaic microbe; Beijerinck (1898) → coined "virus" / Contagium vivum fluidum; Stanley (1935) → crystallised viruses; Diener (1971) → viroid in potato spindle tuber disease. Whittaker (1969) → five kingdoms.
- **Lichen partners:** phycobiont = autotrophic (algal); mycobiont = heterotrophic (fungal). NTA reverses the roles in distractors.
- **Bacterial cell wall composition.** NCERT says bacteria have a **non-cellulosic** cell wall of polysaccharide plus amino acid (NCERT §2.1, p. 12). Distractors that say "cellulosic" or "chitinous" are wrong — chitin is fungal, cellulose is plant/dinoflagellate.
- **Five-kingdom criteria.** Whittaker's 1969 criteria are precisely **five**: cell structure, body organisation, mode of nutrition, reproduction, and **phylogenetic relationships**. CUET sometimes drops phylogenetic relationships and replaces it with "habitat" or "pigment type" — both wrong.
- **Diatom example trap.** Diatoms are chrysophytes, **not** dinoflagellates; their indestructible silica walls form diatomaceous earth. They are described as the "chief producers in the oceans" (NCERT §2.2.1, p. 14), a phrase NTA likes to quote.
- **Slime mould plasmodium ≠ Plasmodium (sporozoan).** The slime-mould multinucleate creeping mass is called a plasmodium (lowercase, common noun); *Plasmodium* (italic, capital) is the malarial sporozoan. Same word, different referents — a textbook trap.
- **Conidia are exogenous, ascospores are endogenous.** Conidia are produced exogenously on conidiophores; ascospores are produced endogenously inside sac-like asci within ascocarps. Direction-of-production trap.
- **Number of nuclei per fungal cell.** Phycomycetes: many nuclei per cell (coenocytic). Ascomycetes/Basidiomycetes: pass through a dikaryotic n+n stage. Deuteromycetes: septate, reproduce only by conidia. Mismatching this is a very common MCQ slip.
- **Plant kingdom exceptions.** Most Plantae are autotrophic, but NCERT lists insectivorous Bladderwort and Venus fly trap (partially heterotrophic) and *Cuscuta* (parasitic). Distractors that say "all members of Plantae are autotrophic" are false.
- **Body organisation across kingdoms.** Monera: prokaryotic single cell. Protista: eukaryotic single cell. Fungi: multicellular (mostly), except yeast (*Saccharomyces* — unicellular ascomycete). Plantae/Animalia: multicellular eukaryotic. Quick-recall trap for kingdom-feature MCQs.

Practice MCQs

Q1. Who proposed the Five Kingdom Classification of living organisms and in which year?

- A. Carolus Linnaeus, 1758
- B. Ernst Haeckel, 1866
- C. R.H. Whittaker, 1969
- D. Aristotle, 350 BC

Q2. Which of the following was **NOT**** among the main criteria used by Whittaker to delimit his five kingdoms?**

- A. Cell structure
- B. Body organisation
- C. Mode of nutrition and reproduction
- D. Type of pigments in the cytoplasm

Q3. Match the following groups of Kingdom Monera with their correct feature: | Group | Feature | |---|---| | (i) Methanogens | (p) Smallest living cells, no cell wall | | (ii) Cyanobacteria | (q) Live in marshy areas / ruminant gut | | (iii) Mycoplasma | (r) Photosynthetic autotrophs with chlorophyll a | | (iv) Chemosynthetic autotrophs | (s) Oxidise nitrates, nitrites, ammonia for ATP |

- A. (i)-p, (ii)-q, (iii)-r, (iv)-s
- B. (i)-q, (ii)-r, (iii)-p, (iv)-s
- C. (i)-q, (ii)-s, (iii)-p, (iv)-r
- D. (i)-r, (ii)-q, (iii)-s, (iv)-p

 **12 more MCQs + answer key**

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PYQ Alignment

This chapter is among the highest-yielding in CUET Biology, typically contributing ~10–12 MCQs across paper sets per year. Question patterns repeatedly seen include scientist-discovery matches (Ivanowsky/Beijerinck/Stanley/Diener/Whittaker), example-to-group matches (*Gonyaulax*, *Nostoc*, *Trypanosoma*, *Plasmodium*, *Agaricus*, *Penicillium*, *Mucor*), distinguishing cell-wall composition across kingdoms (chitin vs cellulose vs silica vs pellicle vs absent), spore-type-per-fungal-class, and assertion-reason items on cyanobacteria, mycoplasma, viroids, prions, and lichen symbiosis. See </pyq/biology> for the full PYQ archive.

Biological Classification appeared in CUET (UG) Biology across 3 cycle(s) — 10 question(s) total. The questions below were extracted from official CUET (UG) papers and matched to this chapter by topic. See </pyq/biology> for the full PYQ archive.

CUET 2023 — Actual PYQs from this chapter

Q.12 (CUET 2023) Identify the statements true for RNA: (A) RNA acts as genetic material for some viruses. (B) RNA functions as adaptor molecule. (C) RNA has hexose sugar backbone. (D) RNA acts as catalyst in some cases.

- A) A, B and C only
- B) A, B and D only
- C) B, C and D only
- D) A, C and D only

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.20 (CUET 2023) Match causal agent with disease (A) *Salmonella typhi* (B) *Streptococcus pneumoniae* (C) Rhino virus (D) *Plasmodium* (I) Typhoid (II) Pneumonia (III) Common cold (IV) Malaria

- A) A-I, B-II, C-III, D-IV
- B) A-III, B-I, C-IV, D-II
- C) A-II, B-III, C-IV, D-I
- D) A-IV, B-III, C-I, D-II

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.21 (CUET 2023) Which crop was made resistant to yellow mosaic virus and powdery mildew by mutation breeding?

- A) Cowpea
- B) Flat bean
- C) Mung bean

- D) Brassica

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.22 (CUET 2023) Match List-I with List-II List-I (A) Sterilized plant part (B) Genetically similar plants (C) Meristem (D) Somatic hybrids List-II (I) Tomato (II) Virus free culture (III) Somaclones (IV) Explants

- A)
- B)
- C)
- D)

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.31 (CUET 2023) RNA interference in tobacco plant was used to develop resistance against:

- A) Viruses
- B) Fungi
- C) Nematodes
- D) Insects

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.40 (CUET 2023) Which of the following is NOT a category of waste generated in hospitals? (1) Radioactive waste (2) Biodegradable waste (3) Plastic waste (4) Non-biodegradable waste Section-2: Comprehension Passage 1. Complex life cycle of parasites mean: (1) Having only one intermediate host (2) Having special adaptations to cling on the host (3) Having many hosts (4) Having one or two intermediate hosts to facilitate parasitisation of its primary host 2. Parasites harm the host by: (1) Reducing its size (2) Improving its growth and reproduction (3) Reducing its survival, growth, reproduction and population density (4) Improving its survival, growth and reproduction 3. Parasitic adaptations include: (1) Loss of unnecessary organs (2) Development of hooks and suckers (3) Thick cuticle (4) All of the above 4. Match List-I with List-II List-I (A) Cuckoo and Crow (B) Copepods (C) Plasmodium (D) Orchids and Mango tree List-II (I) Ectoparasite (II) Commensal organism (III) Brood parasitism (IV) Endoparasite Choose the correct answer: (1) A-III, B-I, C-IV, D-II (2) A-III, B-II, C-IV, D-I (3) A-I, B-III, C-II, D-IV (4) A-IV, B-III, C-I, D-II 5. Identify the statements which are NOT true with respect to host-parasite relationship. (A) Host and parasite tend to co-evolve. (B) Parasites have evolved elaborate nervous system for survival. (C) If the host evolves to reject the parasite, the parasite also evolves mechanisms to counter them. (D) If host evolves mechanisms for rejecting parasite, parasite evolves to be successful in another host species. Choose the correct answer: (1) A and B only (2) C and D only (3) B and D only (4) A and C only 6. What are the intermediate hosts for human liver fluke? (1) Snail and fish (2) Snail and freshwater mussel (3) Fish and man (4) Snail and man 51. Fresh water animals cannot survive for long in sea water because they face: (1) Temperature variations (2) Tidal waves (3)

Predators (4) Osmotic problems 52. The natural interconnections of food chains is known as: (1) Grazing food chain (2) Detritus food chain (3) Food web (4) Biomass pyramid 53. Which of the following statements are correct regarding food chain? (A) Primary carnivores are tertiary consumers (B) Energy flow from sun to producers and then to consumers is unidirectional (C) Death of an organism initiates detritus food chain (D) Plants are primary consumers Choose the correct answer: (1) A and B only (2) A and D only (3) B and C only (4) C and D only 54. The historic convention on Biological Diversity held in Rio de Janeiro in 1992 is also called: (1) World Summit (2) MAB Programme (3) Earth Summit (4) G-16 Summit 55. Which of the following area is one of India's biodiversity hotspots? (1) Eastern Ghats (2) Indo-Burma region (3) Aravali Hills (4) Indo-Gangetic plains 56. Dobson Units (DU) are used to measure: (1) Biodiversity index (2) Thickness of ozone layer (3) Sustainability index (4) Thickness of canopy in rainforest 57. Which of the following is NOT a category of waste generated by human beings in daily practice? (1) Radioactive waste (2) Biodegradable waste (3) Plastic waste (4) Non-biodegradable waste 58. Read the given paragraph and answer the question Parasitism has evolved in many taxonomic groups from plants to higher vertebrates. Many parasites have evolved to be host-specific in such a way that both host and parasite tend to co-evolve. In accordance with their life styles, parasites evolve special adaptations and complex life cycles. Complex life cycle of parasites means: (1) Having only one intermediate host (2) Having special adaptations to cling on the host (3) Having many hosts (4) Having one or two intermediate hosts to facilitate parasitisation of its primary host 59. Parasites harm the host by: (1) Reducing its size (2) Improving its growth and reproduction (3) Reducing its survival, growth, reproduction and population density (4) Improving its survival and reproduction 60. Parasitic organisms may show adaptations such as: (1) Loss of unnecessary organs (2) Hooks and suckers for attachment (3) Thick cuticle (4) All of the above 61. Match List-I with List-II List-I (A) Cuckoo and Crow (B) Copepods (C) Plasmodium (D) Orchids and Mango tree List-II (I) Ectoparasite (II) Commensal organism (III) Brood parasitism (IV) Endoparasite Choose the correct answer: (1) A-III, B-I, C-IV, D-II (2) A-III, B-II, C-IV, D-I (3) A-I, B-III, C-II, D-IV (4) A-IV, B-III, C-I, D-II 62. Identify the statements which are NOT true regarding host-parasite relationship: (A) Host and parasite tend to co-evolve (B) Parasites evolve elaborate nervous system for survival (C) If host evolves mechanisms to reject parasite, parasite evolves mechanisms to counter them (D) Parasites evolve adaptations to live in host Choose correct answer: (1) A and B only (2) C and D only (3) B and D only (4) A and C only 63. What are the intermediate hosts for human liver fluke? (1) Snail and fish (2) Snail and freshwater mussel (3) Fish and man (4) Snail and man 64. The following organism is an ectoparasite: (1) Louse (2) Tapeworm (3) Plasmodium (4) Ascaris 65. Which of the following is an example of brood parasitism? (1) Cuckoo laying eggs in crow's nest (2) Orchid growing on mango tree (3) Louse on human body (4) Tapeworm in intestine 66. In parasitic plants, the absorbing organ that penetrates host tissue is called: (1) Haustorium (2) Rhizome (3) Tendril (4) Stolon 67. The relationship between orchid and mango tree is: (1) Parasitism (2) Mutualism (3) Commensalism (4) Predation 68. The parasite that lives inside the body of host is called: (1) Endoparasite (2) Ectoparasite (3) Predator (4) Commensal 69. The parasite that lives on the external surface of host is called: (1) Endoparasite (2) Ectoparasite (3) Symbiont (4) Predator 70. Parasitic adaptations include: (1) Loss of digestive system (2) Development of hooks and suckers (3) High reproductive capacity (4) All of the above 71. Which parasite causes malaria? (1) Plasmodium (2) Trypanosoma (3) Leishmania (4) Entamoeba 72. The vector of malaria parasite is: (1) Male Anopheles

mosquito (2) Female Anopheles mosquito (3) Housefly (4) Tsetse fly 73. Tapeworm belongs to the phylum: (1) Platyhelminthes (2) Nematoda (3) Annelida (4) Arthropoda 74. Ascaris belongs to the phylum: (1) Nematoda (2) Platyhelminthes (3) Annelida (4) Arthropoda 75. The disease caused by Wuchereria bancrofti is: (1) Filariasis (2) Malaria (3) Dengue (4) Typhoid 76. The vector of filariasis is: (1) Female Culex mosquito (2) Female Anopheles mosquito (3) Aedes mosquito (4) Housefly 77. Dengue fever is transmitted by: (1) Anopheles mosquito (2) Aedes mosquito (3) Culex mosquito (4) Housefly 78. AIDS is caused by: (1) Bacteria (2) Virus (3) Fungus (4) Protozoa 79. HIV attacks mainly: (1) RBCs (2) WBCs (helper T-cells) (3) Platelets (4) Neurons 80. ELISA test is used for detection of: (1) HIV infection (2) Malaria (3) Typhoid (4) Tuberculosis 81. Antibiotics are effective against: (1) Viruses (2) Bacteria (3) Fungi (4) Protozoa 82. Penicillin is produced by: (1) Penicillium notatum (2) Aspergillus (3) Rhizopus (4) Saccharomyces 83. The bacterium used in production of curd is: (1) Lactobacillus (2) Rhizobium (3) Streptococcus (4) Nitrosomonas 84. Biogas is produced mainly by: (1) Methanogens (2) Cyanobacteria (3) Nitrogen-fixing bacteria (4) Fungi 85. Methanogens belong to: (1) Archaeobacteria (2) Eubacteria (3) Cyanobacteria (4) Fungi 86. Sewage treatment involves: (1) Primary treatment (2) Secondary treatment (3) Tertiary treatment (4) All of the above 87. The activated sludge process occurs during: (1) Primary treatment (2) Secondary treatment (3) Tertiary treatment (4) None 88. Bioreactors are used in: (1) Industrial fermentation (2) Sewage treatment (3) Production of antibiotics (4) All of the above 89. The process of producing identical copies of DNA is called: (1) Replication (2) Transcription (3) Translation (4) Mutation 90. Transcription produces: (1) DNA (2) RNA (3) Protein (4) Lipids 91. Translation occurs in: (1) Nucleus (2) Cytoplasm (3) Mitochondria (4) Golgi body 92. The genetic code is: (1) Overlapping (2) Degenerate (3) Universal (4) Both (2) and (3) 93. Start codon in genetic code is: (1) AUG (2) UAA (3) UAG (4) UGA 94. Stop codons are: (1) AUG, UAA (2) UAA, UAG, UGA (3) AUG, UAG (4) UGA only 95. Ribosome is composed of: (1) DNA and protein (2) RNA and protein (3) DNA and RNA (4) Lipids and protein 96. Central dogma of molecular biology was proposed by: (1) Watson (2) Crick (3) Mendel (4) Darwin 97. Genetic engineering involves: (1) Recombinant DNA technology (2) Cloning (3) Gene transfer (4) All of the above 98. PCR technique was developed by: (1) Kary Mullis (2) Watson (3) Crick (4) Chargaff 99. The enzyme used in PCR is: (1) DNA polymerase (2) RNA polymerase (3) Ligase (4) Amylase 100. The bacterium commonly used in recombinant DNA technology is:

- A) Bacillus
- B) Escherichia coli
- C) Lactobacillus
- D) Rhizobium

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

CUET 2024 — Actual PYQs from this chapter

Q.19 (CUET 2024) Identify incorrect statements about diseases: (A) Typhoid severe cases cause intestinal perforation (B) Common cold caused by Rhinovirus (C) Pneumonia

causes bluish lips and nails (D) Pneumonia caused by Salmonella (E) Typhoid confirmed by Widal test

- A)
- B)
- C)
- D)

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.27 (CUET 2024) Incorrect pair of organism and cell-wall degrading enzyme:

- A) Fungi – Chitinase
- B) Algae – Methylase
- C) Plant cells – Cellulase
- D) Bacteria – Lysozyme

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

CUET 2025 — Actual PYQs from this chapter

Q.8 (CUET 2025) Which type of innate immunity is exhibited by interferons secreted by virus-infected cells?

- A) Physical barriers
- B) Cytokine barriers
- C) Physiological barriers
- D) Cellular barriers

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key

Q.23 (CUET 2025) Baculoviruses are pathogens that attack:

- A) Insects
- B) Roundworms
- C) Molluscs
- D) Birds

Tests: aligns with chapter content **Answer:** Not in extracted key — verify against official NTA key