

Biological Classification — NEET MCQs with Solutions

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Q1. All of the following are major bases of modern biological classification EXCEPT

- (A) Cell organization
- (B) Evolutionary relationships
- (C) Age of the organism
- (D) Mode of nutrition

Q2. Two organisms show identical external morphology but differ in internal cell organization. The correct basis for their classification is

- (A) Body coloration and surface texture
- (B) Habitat and ecological niche
- (C) Reproductive strategy and gamete type
- (D) Cell structure and internal organization

Q3. A photosynthetic organism lacking a true nucleus will be classified primarily using

- (A) Cell structure
- (B) Presence of photosynthetic pigments
- (C) Aquatic habitat
- (D) Mode of reproduction

Q4. All of the following are features of Kingdom Monera EXCEPT

- (A) Prokaryotic cell organization
- (B) Unicellular body form
- (C) Absence of true nucleus
- (D) Presence of membrane-bound mitochondria

Q5. All prokaryotes are placed under Kingdom Monera because they share which defining structural feature?

- (A) Ability to survive extreme environmental conditions
- (B) Absence of true nucleus and all membrane-bound organelles, defining the prokaryotic condition
- (C) Exclusively autotrophic mode of nutrition
- (D) Reproduction only by binary fission

Q6. Which feature most clearly distinguishes Kingdom Plantae from Kingdom Protista, given that both include photosynthetic eukaryotes?

- (A) True tissue and organ differentiation with embryonic development
- (B) Presence of chlorophyll and photosynthetic pigments
- (C) Eukaryotic cell organization
- (D) Ability to reproduce asexually

Q7. Which of the following is NOT a feature of prokaryotic cells?

- (A) 70S ribosomes composed of 50S and 30S subunits
- (B) Nucleoid region containing circular DNA
- (C) Plasmids as extrachromosomal genetic elements
- (D) Membrane-bound nucleus enclosing the chromosomal DNA

Q8. Nitrosomonas and Nitrobacter are chemosynthetic bacteria that play a critical role in the nitrogen cycle by

- (A) Converting atmospheric nitrogen gas to ammonia
- (B) Converting ammonia to nitrite (Nitrosomonas) and nitrite to nitrate (Nitrobacter) through oxidation
- (C) Converting nitrate back to atmospheric nitrogen through denitrification
- (D) Fixing nitrogen symbiotically inside legume root nodules

Q9. Heterocysts in cyanobacteria are specialized for nitrogen fixation because they

- (A) Contain nitrogenase and perform photosynthesis simultaneously using oxygen
- (B) Provide an anaerobic microenvironment by lacking Photosystem II, protecting oxygen-sensitive nitrogenase
- (C) Are the only cells capable of binary fission in the filament
- (D) Accumulate fixed nitrogen as nitrate for export to vegetative cells

Q10. Protozoans are classified into four groups primarily on the basis of

- (A) Mode of sexual reproduction — conjugation, fertilization, or sporulation
- (B) Mode of locomotion — pseudopodia, flagella, cilia, or absence of locomotor organelles (sporozoans)
- (C) Cell wall composition — presence or absence of cellulose, silica, or chitin
- (D) Pigment type — photosynthetic or non-photosynthetic

Q11. Entamoeba histolytica causes amoebic dysentery by

- (A) Invading the intestinal mucosa using pseudopodia and lysing host cells, causing ulceration and bloody diarrhoea
- (B) Producing neurotoxins that disrupt intestinal nerve signalling
- (C) Blocking intestinal villi with cysts, preventing nutrient absorption
- (D) Releasing LPS endotoxins identical to Gram-negative bacteria during intestinal colonisation

Q12. Paramecium achieves genetic recombination through conjugation, which involves

- (A) Asexual division producing genetically identical daughter cells
- (B) Multiple fission producing numerous offspring simultaneously
- (C) Temporary fusion of two compatible cells with mutual exchange of micronuclear genetic material
- (D) Formation of resistant cysts that merge and exchange nuclei

Q13. Ascomycetes are commonly called sac fungi because they

- (A) Form fruiting bodies called ascocarps
- (B) Produce spores inside sporangia
- (C) Produce ascospores inside sac-like asci
- (D) Are found exclusively in water

Q14. The correct sequence of events in sexual reproduction of fungi is

- (A) Plasmogamy → Karyogamy → Meiosis
- (B) Karyogamy → Plasmogamy → Meiosis
- (C) Meiosis → Plasmogamy → Karyogamy
- (D) Plasmogamy → Meiosis → Karyogamy

Q15. Zygosporangium formation in Phycomycetes involves which of the following processes?

- (A) Fusion of two gametangia producing a thick-walled diploid resting spore
- (B) Fusion of two basidiospores to form a dormant structure
- (C) Formation of zygospores inside asci by meiosis
- (D) Zygospores are formed asexually by fragmentation of hyphae

Q16. The scientific discipline dedicated to the study of viruses is called

- (A) Bacteriology
- (B) Mycology
- (C) Protozoology
- (D) Virology

Q17. Mad Cow Disease (Bovine Spongiform Encephalopathy) is caused by

- (A) A viroid with no protein coat
- (B) A bacterium producing neurotoxins
- (C) A prion — an infectious misfolded protein with no nucleic acid
- (D) A retrovirus with reverse transcriptase

Q18. Which of the following correctly represents the chronological sequence of landmark discoveries in the history of virology, as described in NCERT Class 11?

- (A) Stanley → Ivanowsky → Beijerinck
- (B) Ivanowsky → Beijerinck → Stanley
- (C) Beijerinck → Stanley → Ivanowsky
- (D) Diener → Ivanowsky → Beijerinck

Q19. Which of the following diseases is caused by a viroid?

- (A) Potato spindle tuber disease
- (B) Mad cow disease
- (C) Polio
- (D) Tobacco mosaic disease

Q20. Which of the following correctly explains why viroids are considered structurally simpler than viruses?

- (A) Viroids contain double-stranded RNA whereas viruses contain single-stranded RNA
- (B) Viroids consist only of naked RNA with no protein coat, whereas all viruses possess at least a protein capsid
- (C) Viroids are smaller than viruses and therefore contain fewer genes
- (D) Viroids lack both RNA and protein, existing as pure lipid particles

Q21. Viroids are best described as

- (A) Acellular DNA particles lacking RNA
- (B) Nucleoprotein complexes smaller than viruses
- (C) Naked infectious RNA molecules without any protein coat
- (D) Proteinaceous infectious particles lacking nucleic acid

Q22. Which of the following diseases is correctly associated with prions?

- (A) Bovine Spongiform Encephalopathy (BSE)
- (B) Potato Spindle Tuber Disease
- (C) Poliomyelitis
- (D) Influenza

Q23. Prion diseases are classified as neurodegenerative disorders because they:

- (A) Cause rapid bacterial lysis of neurons
- (B) Trigger viral replication inside brain cells
- (C) Stimulate overproduction of neural proteins
- (D) Cause progressive spongiform degeneration of brain tissue

Q24. The infectious nature of prions is due to their ability to:

- (A) Induce template-directed misfolding of normal PrP^c into PrP^{sc}
- (B) Integrate into host DNA and alter gene expression
- (C) Synthesize viral RNA using host polymerase
- (D) Produce neurotoxic protein aggregates via ribosomal translation

Answer key and explanations

Q1. Answer: (C) Age of the organism

Age of an organism has no taxonomic significance and is not used as a classification criterion. Cell organization, evolutionary relationships, and mode of nutrition are all explicitly recognized criteria in modern systematics.

Q2. Answer: (D) Cell structure and internal organization

Internal cell organization is more fundamental than superficial morphology. Two organisms may convergently evolve similar body forms (analogous structures) while being phylogenetically distant; cell structure reflects true evolutionary position.

Q3. Answer: (A) Cell structure

Cyanobacteria are photosynthetic but prokaryotic. Cell structure (absence of true nucleus) overrides nutritional mode in determining kingdom placement — this organism belongs to Monera, not Plantae, despite being photosynthetic.

Q4. Answer: (D) Presence of membrane-bound mitochondria

Monera are prokaryotic and completely lack membrane-bound organelles, including mitochondria. Options A, B, and C are all defining features of Monera. Mitochondria are eukaryotic organelles present in Protista, Fungi, Plantae, and Animalia.

Q5. Answer: (B) Absence of true nucleus and all membrane-bound organelles, defining the prokaryotic condition

The defining feature of Monera is prokaryotic cell organization — absence of true nucleus and membrane-bound organelles. Not all Monera are extremophiles; many are heterotrophic; and some reproduce by means other than simple binary fission (e.g., conjugation).

Q6. Answer: (A) True tissue and organ differentiation with embryonic development

Photosynthetic protists (e.g., diatoms, green algae) are eukaryotic and possess chlorophyll — identical to plants in those features. The distinguishing criterion is tissue differentiation and embryo formation, which are hallmarks of Plantae absent in Protista.

Q7. Answer: (D) Membrane-bound nucleus enclosing the chromosomal DNA

Prokaryotes definitively lack a membrane-bound nucleus — their DNA is in the nucleoid, an unenclosed cytoplasmic region. Options A (70S ribosomes), B (nucleoid), and C (plasmids) are all genuine prokaryotic features that serve as common distractors.

Q8. Answer: (B) Converting ammonia to nitrite (Nitrosomonas) and nitrite to nitrate (Nitrobacter) through oxidation

Nitrification is a two-step aerobic chemosynthetic process: Nitrosomonas oxidizes $\text{NH}_3 \rightarrow \text{NO}_2^-$; Nitrobacter oxidizes $\text{NO}_2^- \rightarrow \text{NO}_3^-$. Both derive energy from these inorganic oxidations. Nitrogen fixation ($\text{N}_2 \rightarrow \text{NH}_3$) is performed by different bacteria (Rhizobium, Azotobacter); denitrification is performed by Pseudomonas.

Q9. Answer: (B) Provide an anaerobic microenvironment by lacking Photosystem II, protecting oxygen-sensitive nitrogenase

Nitrogenase enzyme is irreversibly inactivated by oxygen. Heterocysts lack Photosystem II (which evolves O_2) and have thick walls with extra glycolipid layers — creating the anaerobic microenvironment nitrogenase requires. Vegetative cells perform photosynthesis; heterocysts fix nitrogen.

Q10. Answer: (B) Mode of locomotion — pseudopodia, flagella, cilia, or absence of locomotor organelles (sporozoans)

NCERT classifies protozoans into: amoeboid (pseudopodia), flagellated (flagella), ciliated (cilia), and sporozoans (no locomotor organelle in adult stage). Locomotion is the primary grouping criterion — not reproduction or pigmentation.

Q11. Answer: (A) Invading the intestinal mucosa using pseudopodia and lysing host cells, causing ulceration and bloody diarrhoea

E. histolytica uses pseudopodia to invade intestinal epithelium and produces proteases that lyse host cells — causing flask-shaped ulcers, bloody mucoid stools (dysentery), and potentially liver abscess if it enters the portal circulation. It is transmitted via faecal-oral route through contaminated food or water.

Q12. Answer: (C) Temporary fusion of two compatible cells with mutual exchange of micronuclear genetic material

During conjugation, two compatible Paramecium cells align and form a cytoplasmic bridge. Micronuclei undergo meiosis; haploid micronuclei are exchanged reciprocally. After separation, each cell reconstitutes its macronucleus from the new micronucleus — achieving genetic recombination without increase in cell number.

Q13. Answer: (C) Produce ascospores inside sac-like asci

Ascomycetes form ascospores inside sac-like structures called asci — this naming is directly from NCERT. "Water moulds" (Oomycetes) are no longer classified as fungi; this option tests whether students confuse older classifications.

Q14. Answer: (A) Plasmogamy → Karyogamy → Meiosis

Sexual reproduction in fungi follows plasmogamy (cytoplasm fusion), then karyogamy (nuclear fusion), then meiosis to restore haploid state. Reversing karyogamy and meiosis is the most common student error — Option D is the classic trap.

Q15. Answer: (A) Fusion of two gametangia producing a thick-walled diploid resting spore

In Phycomycetes, zygospores form by the fusion of two gametangia (gametangial copulation), producing a thick-walled, resistant resting spore. Option B confuses basidiospores (which are already post-meiotic products) with zygospore parents; Option C incorrectly assigns asci to Phycomycetes.

Q16. Answer: (D) Virology

Virology is the branch of microbiology focused on viruses — their structure, classification, replication, and disease causation. While this is an EASY recall question, it anchors the foundational vocabulary expected in NEET.

Q17. Answer: (C) A prion — an infectious misfolded protein with no nucleic acid

BSE is caused by prions — abnormally folded PrP (prion protein) that induces misfolding of normal PrP in neural tissue, leading to spongiform neurodegeneration. Option A (viroid) is the most common wrong answer — students confuse prions and viroids as both being "sub-viral agents."

Q18. Answer: (B) Ivanowsky → Beijerinck → Stanley

NCERT describes: Ivanowsky (1892) showed tobacco mosaic disease was caused by a filterable agent smaller than bacteria; Beijerinck (1898) demonstrated the agent was a "contagium vivum fluidum" (living fluid) that could reproduce; Stanley (1935) crystallised TMV, proving its chemical nature. Diener (viroid discoverer) is from a later and separate context.

Q19. Answer: (A) Potato spindle tuber disease

Potato spindle tuber disease is the classic NCERT example of a viroid-caused plant disease. Mad cow disease is caused by a prion; polio by a virus; TMD by TMV (a virus).

Q20. Answer: (B) Viroids consist only of naked RNA with no protein coat, whereas all viruses possess at least a protein capsid

The defining structural simplicity of viroids is the complete absence of a protein coat — all viruses, at minimum, have a capsid surrounding their nucleic acid. Option C is a trap: size and gene count are consequences, not the primary structural distinction.

Q21. Answer: (C) Naked infectious RNA molecules without any protein coat

Viroids are naked infectious RNA — no protein, no DNA, no envelope. Option D precisely describes prions — the ELITE trap for students who mix up the two anomalous infectious agents.

Q22. Answer: (A) Bovine Spongiform Encephalopathy (BSE)

BSE (mad cow disease) is the NCERT-cited prion disease. Potato spindle tuber disease = viroid; Polio and Influenza = viruses.

Q23. Answer: (D) Cause progressive spongiform degeneration of brain tissue

Prion diseases produce characteristic sponge-like vacuolation and holes in brain tissue, leading to irreversible neurodegeneration. Options A and B wrongly imply bacterial or viral involvement.

Q24. Answer: (A) Induce template-directed misfolding of normal PrP^c into PrP^{sc}

Prions propagate by forcing normal PrP^c proteins to adopt the abnormal PrP^{sc} conformation — a self-propagating chain reaction requiring no nucleic acid. Option D is the top trap: aggregation occurs, but translation is not involved since prions encode nothing.

Groups, examples and key facts

Group and examples	Key fact
Archaeobacteria (methanogens, halophiles, thermoacidophiles)	Live in extreme habitats; unique cell wall; methanogens produce biogas
Cyanobacteria (Nostoc, Anabaena)	Photosynthetic; heterocysts fix atmospheric nitrogen
Mycoplasma	No cell wall; smallest living cells known; survive without oxygen
Chrysophytes (diatoms, desmids)	Silica cell walls; deposits form diatomaceous earth
Dinoflagellates (Gonyaulax)	Rapid multiplication makes the sea look red (red tides)
Euglenoids (Euglena)	Protein-rich pellicle instead of a cell wall; photosynthetic in light, heterotrophic in dark
Protozoa: Amoeba, Trypanosoma, Paramoecium, Plasmodium	Amoeboid, flagellated, ciliated and sporozoan protozoans; Plasmodium causes malaria
Phycomycetes (Mucor, Rhizopus, Albugo)	Aseptate, coenocytic mycelium; zygospores
Ascomycetes (Penicillium, Aspergillus, Claviceps, Neurospora)	Sac fungi; ascospores in asci; yeast is unicellular
Basidiomycetes (Agaricus, Ustilago, Puccinia)	Basidiospores on basidia; no sex organs
Deuteromycetes (Alternaria, Colletotrichum, Trichoderma)	Imperfect fungi: only asexual stage known
Viruses (TMV)	Ivanowsky (1892); Beijerinck called it 'contagium vivum fluidum'; Stanley crystallised it
Viroids	Discovered by T.O. Diener (1971); free RNA without protein coat; potato spindle tuber disease
Prions	Infectious misfolded proteins; bovine spongiform encephalopathy (mad cow disease), CJD
Lichens	Algae + fungi association; good indicators of pollution