ANSWER KEY

TERM-1 EXAMINATION (2025-26)

CLASS: XI **SUBJECT: BIOLOGY**

TIME: 3 Hrs **MAX. MARKS: 70**

SECTION – A (1 × 16 = 16)

1. d) E. Mayr. *(Biological species concept — reproductive isolation.)*
2. c) Kingdom → Phylum → Class → Order.
3. b) Diptera. *(Housefly belongs to order Diptera.)*
4. c) They perform metabolism outside the host. *(Incorrect — viruses lack independent metabolism.)*
5. b) Laminaria. *(Has holdfast, stipe and frond — typical brown algae/kelp.)*
6. d) Gametophytic and haploid
7. b) Bilateral. *(Taenia shows bilateral symmetry.)*
8. a) *Pea — Axile* (this match is incorrect). *(Pea has marginal placentation)*
9. a) All of these. *(I, II and III are correct for prokaryotic cells.)*
10. c) Singer and Nicolson. *(Fluid mosaic model.)*
11. a) Glycosidic linkages. *(Polysaccharides joined by glycosidic bonds.)*
12. d) Enables glucose transport into cells.
13. a) Both A and R are true, and R is the correct explanation of A.
14. c) A is true, but R is false. *(Racemose = indefinite growth of main axis; R is wrong because in racemose the main axis does not terminate in a flower — that happens in cymose.)*
15. a) Both A and R are true, and R is the correct explanation of A. *(Mitochondria produce ATP by oxidative phosphorylation.)*
16. d) Both Assertion and Reason are false.
    Assertion (A) is false: DNA does not contain uracil (uracil is normally in RNA).
    Reason (R) is false: Uracil is a pyrimidine base found in RNA (not both DNA and RNA).

SECTION – B (2 × 5 = 10)

17. *Why are bryophytes called "amphibians of the plant kingdom"?*
    Because they show features of both aquatic and terrestrial life — they require a moist environment for fertilization (male gametes swims through water to reach egg) like aquatic plants, but are adapted to live on land (have structures to survive terrestrial habitats).
18. *Define metamerism. Name one phylum showing this feature.*
    Metamerism: Serial repetition of body segments (metameres) along the longitudinal axis of the body.
    Example phylum: Annelida (e.g., earthworm).
    OR (18 alternate: A- Nerve cord B- Notochord C- Gill slits D- Post anal tail
19. *What is a compound leaf? Give its two types with examples.*
    - Compound leaf: Leaf in which the lamina is divided into distinct leaflets borne on a common rachis.
        - Pinnately compound — e.g., *Neem (Azadirachta)*, *Rose (Rosa)*.

- Palmately compound — e.g., silk cotton, *Aesculus (horse-chestnut)* (leaflets radiate from a single point).

20. *Types of chromosomes by centromere position:*
Metacentric, Submetacentric, Acrocentric, Telocentric. (Diagrams)
21. *Difference between tertiary and quaternary structure of proteins with one example each:*
Tertiary structure: 3-D folding of a single polypeptide chain due to interactions (hydrophobic interactions, H-bonds, ionic bonds, disulfide bridges). *Example:* Myoglobin.
Quaternary structure: Association/assembly of two or more polypeptide chains (subunits) into a functional protein. *Example:* Hemoglobin (four subunits).

SECTION – C (3 × 7 = 21)

22. *Three differences between red algae (Rhodophyta) and brown algae (Phaeophyta):*

Feature	Red algae (Rhodophyta)	Brown algae (Phaeophyta)
Major pigments	Chlorophyll a + phycobilin's (phycoerythrin, phycocyanin)	Chlorophyll a, c + fucoxanthin (gives brown color)
Reserve food	Floridian starch	Laminarin (and mannitol)
Cell wall substances	Agar, carrageenan	Alginates
Typical form	Mostly small, often deep-water marine	Often large kelps with holdfast, stipe, frond

OR (22 alternate – Plant is *Equisetum*: A- strobilus B- branch C- rhizome commonly known as horsetails belongs to the division Pteridophyta

23. *Identify phyllotaxy A, B, C and give one example each.*
- Typical school examples:
  - A — Alternate phyllotaxy (one leaf per node, alternate arrangement). *Example:* Sunflower (*Helianthus*), China rose has alternate leaves.
  - B — Opposite phyllotaxy (two leaves at a node opposite each other). *Example: Calotropis*, *Guava* (Psidium).
  - C — Whorled phyllotaxy (three or more leaves at a node in a circle). *Example: Alstonia*, *Nerium* (some species).

24. *Draw and label a T.S. of a monocot stem. NCERT DIAGARM*
25. *Draw a neat labelled diagram of the alimentary canal of a cockroach. NCERT DIAGARAM*
26. *Structure and function of the Golgi apparatus*
- Structure: Series of flattened membrane-bound cisternae (stack). Two faces: cis (forming) face toward ER and trans (maturing) face from which vesicles bud; small transport vesicles at margins.
- Functions: Modification (glycosylation, phosphorylation) and sorting of proteins and lipids received from ER; packaging into secretory vesicles; formation of lysosomes; secretion (exocytosis); cell plate formation in plant cytokinesis.

27. *Recognise A and B (diagrammatic representation). Mention one difference between them.*
A- Adenine (purine): present in DNA

B: Uracil (pyrimidine): present in RNA

28. *Three differences between mitosis and meiosis:*

Feature	Mitosis	Meiosis
Number of divisions	One division (equational)	Two successive divisions (reductional + equational)
Number of daughter cells	2 daughter cells	4 daughter cells
Chromosome number	Daughter cells are diploid (2n) — same as parent	Daughter cells are haploid (n) — half of parent
Genetic variation	Produces genetically identical cells	Produces genetically varied cells (crossing over, independent assortment)

SECTION – D (Case based) (4 × 2 = 8)

29. *Marine aquarium observation*
    a) Jellyfish phylum: Cnidaria. Characteristic feature: Presence of cnidocytes/nematocysts (stinging cells) and radial symmetry; diploblastic body (ectoderm & endoderm) with mesoglea.
    b) Starfish symmetry & skeleton: Starfish show radial (pentaradial) symmetry. Their skeleton is an endoskeleton (calcareous ossicles beneath the epidermis).
    c) Class of bony fishes and distinguishing feature: Class Osteichthyes (bony fishes; in modern classification Actinopterygii for ray-finned fishes). One distinguishing feature: bony skeleton (ossified bones) and presence of an operculum covering the gills (which cartilaginous fishes typically lack). Also many have swim bladder.

30. *Frog anatomy observations*
    a) Type of circulation: Double circulation (incomplete double circulation) — pulmonary (lungs/skin) and systemic circuits, but ventricular mixing occurs since there is a single ventricle.
    b) Two adaptations for respiration:
        - Moist, highly vascularized skin for cutaneous respiration.
        - Lungs (paired) for pulmonary respiration and buccal pumping mechanism to ventilate lungs.
    c) Why 3-chambered heart: Frog's heart has three chambers — two atria (left and right) and one ventricle, hence called three-chambered.
    d) Sexual dimorphism in frogs: Males typically smaller, develop nuptial pads (thumb pads) on forelimbs to hold female during amplexus and often possess vocal sacs / larger vocal sacs to call; females are usually larger and carry eggs (ovaries).

SECTION – E (5 × 3 = 15)

31. *(Dicot stem T.S., functions, differences)*
    a) Drawing guidance for T.S. of dicot stem (label these): Epidermis → Cortex (with hypodermis and collenchyma) → Collateral vascular bundles arranged in a ring → Vascular cambium (between xylem & phloem) → Xylem (wood) toward inside → Phloem toward outside → Pith at center.
    b) Two functions of xylem:
        1. Conduction of water and dissolved mineral salts from roots to aerial parts.

2. Mechanical support (lignified elements provide strength to stem).

c) Differentiate (brief):

- i) Open vs closed vascular bundles:
  - Open bundle: Has vascular cambium between xylem and phloem; can produce secondary growth (found in dicot stem).
  - Closed bundle: Lacks cambium; no secondary growth in that bundle (common in monocot stems).
- ii) Radial vs conjoint vascular bundles:
  - Radial bundle: Xylem and phloem arranged in alternate radial groups (typical of roots).
  - Conjoint bundle: Xylem and phloem occur together in the same radial line (typical of stems).

32. *(Cell cycle & mitosis/meiosis)*

a) Phases of the cell cycle in sequence: G1 → S → G2 → M (M = mitosis). *(G0 is quiescent phase outside cycle.)*

b) Events of metaphase in mitosis:

- Chromosomes are condensed and aligned along the metaphase plate (equatorial plane).
- Sister chromatids are attached to spindle microtubules by kinetochores; spindle fibers from opposite poles attach to each sister chromatid, ensuring proper segregation.
- Chromosome alignment checkpoint ensures all chromosomes are properly attached before anaphase.

c) Significance (one each):

- Mitosis: Growth, tissue repair, asexual reproduction — produces genetically identical daughter cells.
- Meiosis: Formation of gametes (reduces chromosome number by half) and generates genetic variation (crossing over and independent assortment).

33. *(Bacteriophage, virus vs viroid, lichen partners)*

a) Labelled diagram of bacteriophage (draw & label following): NCERT DIAGARAM

b) Difference between a virus and a viroid:

- Virus: Consists of nucleic acid (DNA or RNA) enclosed in a protein coat (capsid); may have envelope; can infect animals, plants, bacteria.
- Viroid: Extremely small, naked circular ssRNA molecules without protein coat, infect plants and cause diseases; they do not code for proteins.

c) Mycobiont and phycobiont in lichens and mutual benefit:

- Mycobiont: Fungal partner (usually an ascomycete). Provides structure, protection, water retention, mineral uptake and anchorage.
- Phycobiont: Photosynthetic partner — green alga or cyanobacterium. Performs photosynthesis to produce carbohydrates (food) and sometimes fixes nitrogen (if cyanobacterium).
- Mutual benefit: Phycobiont supplies organic carbon and sometimes nitrogen to fungus; mycobiont supplies a protected, moist environment and minerals — together they form stable symbiotic lichen able to colonize harsh substrates.

Learning out-comes:

* Demonstrate, Knowledge and Understanding:

- State, name, list, identify, define, suggest, describe, outline, summarize, etc. *Application of Knowledge/Concepts:
- Calculate, illustrate, show, adapt, explain, distinguish, etc.

*Analyze, Evaluate and Create:

- Interpret, analyse, compare, contrast, examine, evaluate, discuss, construct, etc