

APRIL,2026
Cell Biology

Full Marks-100

Time-3.00 hours

Answer as per instructions
Figures in the right-hand margin indicates marks

Part-A

Q.1 Multiple Choice Questions (compulsory) (10x1 = 10)

- I) Which cell organelle is absent in prokaryotic cells but present in all eukaryotic cells?
A. Ribosome B. Plasma membrane C. Nucleus D. Cytoplasm
- II) The major component of the plant cell wall is:
A. Chitin B. Cellulose C. Peptidoglycan D. Glycogen
- III) Microfilaments are mainly composed of:
A. Actin B. Tubulin C. Myosin D. Elastin
- IV) Which organelle modifies proteins?
A. Vacuole B. Ribosome C. Lysosome D. Golgi apparatus
- V) Endocytosis is:
A. Export of materials B. Uptake of materials into the cell
C. Cell division D. Protein synthesis
- VI) Mitochondria possess:
A. Only RNA B. Their own DNA and ribosomes
C. Only DNA D. No genetic material
- VII) The nucleolus is the site of:
A. DNA replication B. Lipid synthesis C. Ribosome biogenesis D. Glycolysis
- VIII) The genetic code is
A. Overlapping B. Ambiguous C. Degenerate D. Species-specific
- IX) Which checkpoint ensures DNA is completely replicated before mitosis?
A. G1 checkpoint B. G2 checkpoint
C. Metaphase checkpoint D. Spindle checkpoint
- X) Which statement is TRUE regarding meiosis?
A. DNA replicates twice.
B. Chromosome number doubles.
C. Two successive divisions occur after one DNA replication.
D. It produces diploid gametes.

Part-B

Q.2 Short Questions type maximum 50 words (compulsory) (9x2)

- I) What are microfilaments?
- II) What is facilitated diffusion?
- III) Define exocytosis
- IV) What is osmosis?
- V) Why are mitochondria called the powerhouse of the cell?
- VI) Explain nuclear pore?

- VII) What is F1 particles?
VIII) What is crossing over?
IX) State two functions of mitosis.

Part C

Q.3. Answer any eight question maximum 250 words **(8 × 5)**

- I) Describe the Endosymbiotic Theory and discuss the evidence supporting it.
II) Discuss the chemical composition and organization of the plant cell wall.
III) Describe the various mechanisms of membrane transport across the plasma membrane.
IV) Describe the structure and functions of vacuoles in plant cells.
V) Discuss the biogenesis of chloroplasts.
VI) Explain the types of the lysosomes and their functions.
VII) Describe the structure, functions and significance of the Golgi apparatus.
VIII) Explain the molecular organization of chromatin and chromosomes.
IX) Describe the Meiosis-I and their major cytological significance.
X) Describe the regulation of the cell cycle and the role of checkpoints.

Part D

Answer any four-question maximum 800 words **(4 × 8)**

- Q.4.** Discuss the Fluid Mosaic Model and explain the structural organization and dynamic properties of biological membranes.
Q.5. Discuss the origin, evolution and structural organization of eukaryotic cells in detail.
Q.6. Describe the ultrastructure and bioenergetic functions of mitochondria with a neat labelled diagram.
Q.7. Explain the stages of mitosis with neat labelled diagrams. Discuss its biological significance.
Q.8. Discuss about different nitrogenous bases and add a note on types of DNA.

APRIL,2026
Mycology and Phytopathology

Full Marks-100

Time-3.00 hours

Answer as per instructions
Figures in the right-hand margin indicates marks

Part A

Q.1 Multiple Choice Questions (compulsory) (10x1=10)

- I) The cell wall of fungi is primarily composed of:
A. Cellulose B. Chitin C. Pectin D. Lignin
- II) The vegetative body of fungi is called:
A. Rhizome B. Sporophyte C. Thallus D. Mycelium
- III) Mushroom belongs to:
A. Basidiomycota B. Zygomycota C. Ascomycota D. Oomycota
- IV) Penicillium belongs to:
A. Basidiomycota B. Ascomycota C. Chytridiomycota D. Oomycota
- V) Oomycetes possess cell walls made of:
A. Chitin B. Lignin C. Cellulose D. Pectin
- VI) Mycorrhiza is an association between:
A. Fungus and roots B. Fungus and stem C. Fungus and leaves D. Fungus and algae
- VII) _____ spore stage of Puccinia is associated with secondary host.
A. Uredospore B. Teliospore C. Aeciospore D. Pycniospore
- VIII) The disease triangle consists of:
A. Host, Vector and Soil B. Soil, Water and Air
C. Host, Pathogen and Environment D. Plant, Animal and Climate
- IX) Loose smut of wheat is caused by:
A. Ustilago tritici B. Puccinia graminis C. Rhizopus D. Albugo
- X) _____ is the causal organism of Citrus Canker?
A. TMV B. Puccinia graminis C. Xanthomonas citri D. Alternaria solani

Part B

Q.2 Short Questions type maximum 50 words (compulsory) (9x2)

- I) What are hyphae?
- II) Define basidium.
- III) What is an oospore?
- IV) Mention two ecological roles of lichens.
- V) What are mycotoxins?

- VI) Explain Fairy ring?
- VII) What are mycoherbicides?
- VIII) Mention any two methods of plant disease control.
- IX) What is chlorosis?

Part C

Q.3 Answer any eight-question maximum 250 words (8×5)

- I) Explain the thallus organization of fungi with suitable examples.
- II) Discuss the methods of sexual and asexual reproduction in fungi.
- III) Describe the general characteristics and classification of Oomycota.
- IV) Explain the characteristics and biological significance of slime moulds.
- V) Explain the symbiotic relationships found in fungi and discuss their ecological significance.
- VI) Discuss the role of fungi in food industries with suitable examples.
- VII) Explain the concept of Single Cell Protein (SCP) and discuss its importance.
- VIII) Explain the symptoms and control of angular leaf spot of cotton.
- IX) Explain the causal organism, symptoms and management of early blight of potato.
- X) Discuss the symptoms and causal organism of loose smut of wheat.

Part D

Answer any four-question maximum 800 words (4×8)

- Q.4 Describe the general characteristics of fungi. Write the modes of nutrition and reproduction with suitable examples.
- Q.5 Explain the different types of mycorrhiza and discuss their role in plant nutrition and sustainable agriculture.
- Q.6 Explain the industrial production of antibiotics, enzymes, organic acids, and alcoholic beverages using fungi.
- Q.7 Explain the life cycle of Tobacco Mosaic Virus (TMV). Describe the mechanism of infection, replication and long-distance transport in plants.
- Q.8 Write short notes on:
 - (a) Host–pathogen interaction
 - (b) Disease resistance in plants

APRIL,2026
Microbiology and Phycology

Full Marks-100

Time-3.00 hours

Answer as per instructions
Figures in the right-hand margin indicates marks

Part A

Q.1 Multiple Choice Questions (compulsory)

(10x1)

I) Viruses are:

- A. Prokaryotic organisms B. Eukaryotic organisms
C. Acellular infectious particles D. Multicellular organisms

II) Which virus infects bacteria?

- A. Retrovirus B. Bacteriophage C. Adenovirus D. TMV

III) Bacteria belong to kingdom:

- A. Plantae B. Protista C. Fungi D. Monera

IV) Binary fission is a type of:

- A. Sexual reproduction B. Asexual reproduction C. Vegetative propagation D. Budding

V) Transformation in bacteria was discovered by:

- A. Griffith B. Darwin C. Mendel D. Koch

VI) Which cyanobacterium is used as biofertilizer?

- A. Fucus B. Volvox C. Ulva D. Nostoc

VII) Reserve food in green algae is:

- A. Laminarin B. Floridean starch C. Starch D. Glycogen

VIII) Oedogonium reproduces sexually by:

- A. Isogamy B. Oogamy C. Conjugation D. Budding

IX) Brown colour of Phaeophyta is due to:

- A. Chlorophyll b B. Fucoxanthin C. Carotene D. Xanthophyll only

X) Which one is a red alga?

- A. Polysiphonia B. Fucus C. Vaucheria D. Chlamydomona

Part B

Q.2 Short Questions type maximum 50 words (compulsory)

(9x2)

I) What are prions?

II) Write a short note on Mycoplasma.

III) What are vaccines?

IV) Define lysogenic cycle?

V) What is transduction?

- VI) What is a heterocyst?
- VII) Mention two characteristics of Charophyta
- VIII) What is a coenobium?
- IX) What is Algal bloom?

Part C

Q.3 Answer any eight-question maximum 250 words (8 × 5)

- I) Describe the classification of viruses and explain the Baltimore classification.
- II) Describe the symptoms, transmission and control measures of viral plant diseases.
- III) Explain bacterial genetic recombination through conjugation and transformation.
- IV) Describe the morphology, structure and reproduction of *Nostoc*.
- V) Describe the economic importance of cyanobacteria in agriculture.
- VI) Explain the different types of thallus organization in algae with examples.
- VII) Discuss Fritsch's system of classification of algae.
- VIII) Describe the morphology and sex organs of *Oedogonium*.
- IX) Write the thallus structure with sex organ of Chara.
- X) Discuss the general characteristics, pigmentation and reserve food material of Rhodophyta.

Part D

Answer any four-question maximum 800 words (4×8)

- Q.4) Describe the discovery, general structure and role in vaccine production of viruses.
- Q.5) Discuss the ultrastructure of bacteria and add a note on structural and chemical composition of bacterial cell wall.
- Q.6) Describe the general characteristics and evolutionary significance of Prochloron.
- Q.7) Describe the morphology and reproduction of Chlamydomonas with suitable diagrams.
- Q.8) Describe the life cycle of Polysiphonia with suitable diagrams.
