

April, 2026
Microbiology

Time -3 hours

Full marks-100

Answer all questions as directed. Give illustrated diagrams wherever required. The figures in the right-hand margin indicate full marks for the questions

PART - I

Q.1. Answer All the following questions.

[10x1=10]

- i. Microbes that survive in extreme habitat conditions are called-----
- ii. Cervical cancer in women is caused due to infection by-----
- iii. Penicillin was discovered by
 - a) Fleming b) Jenner c) Spallanzani d) Tyndall
- iv. Smallest known infectious pathogen without capsid is -----.
- v. Genetic recombination involving virus as agent of transfer of genetic material is
 - a) Transduction b) Transformation c) Conjugation d) Binary fission
- vi. Define lichens.
- vii. Bacteria present in curd is -----
- viii. Define vaccination.
- ix. Which enzyme of HIV is responsible for initiating infection -----
 - a) Protease b) Integrase c) Reverse transcriptase d) None of these
- x. Chemicals that prevent replication of virus within host cell are grouped as -----

PART - II

Q.2. Answer ALL the following questions within 50 words each

[9x2=18]

- i. Edward Jenner
- ii. Pasteurization
- iii. Continuous culture
- iv. Capsid
- v. Alexander Fleming
- vi. General features of Archaea
- vii. Rickettsia
- viii. Significance of conjugation
- ix. Morphology of virus

PART - III

Q.3. Answer any EIGHT of the following questions within 250 words each. [8x5=40]

- i. Germ theory
- ii. Biogenesis and abiogenesis
- iii. Endosymbiotic theory
- iv. Mycoplasma
- v. Chemostat
- vi. Bacterial growth curve
- vii. Vaccines
- viii. Oncovirus.
- ix. Viral transmission
- x. Antibiotics.

PART – IV

Answer any FOUR of the following questions within 800 words each. [4x8=32]

Q.4. Give an account on modern trends and future scope of microbiology briefly

Q.5. Describe Whittaker's five kingdom classification of microbiology.

Q.6. Explain genetic recombination in bacteria briefly.

Q.7. Describe structure and replication cycles of Bacteriophage.

Q.8. Give an account on microbial toxins. Discuss on types, mode of action and pathogenicity of toxins.

APRIL, 2026
Cell Biology

Time -3 hours

Full marks-100

Answer all questions as directed. Give illustrated diagrams wherever required. The figures in the right-hand margin indicate full marks for the questions

PART - I

Q.1. Answer All the following questions.

[10x1=10]

- i. Cell division in animal cells is initiated by-----
- ii. Fluid mosaic model of plasma membrane was proposed by-----
- iii. DNA duplication occurs during which phase of cell cycle?
 - a) G1-phase b) S-phase c) G2-phase d) M-phase
- iv. Golgi apparatus in plants is called -----.
- v. Mobile electron carrier in Electron Transport chain is
 - a) Ubiquinone b) FMN c) Cytochromes d) Oxygen
- vi. Define euchromatin.
- vii. Acrosome of spermatozoa are derived from -----
- viii. Why lysosomes are called suicidal bags of the cell?
- ix. Crossing-over between nonsister chromatids of a homologous pair occurs during-----
 - a) Leptotene b) Zygotene c) Pachytene d) Diplotene
- x. Lipid synthesis within cell is carried out by-----

PART - II

Q.2. Answer ALL the following questions within 50 words each.

[9x2=18]

- i. Chromatin
- ii. Unit membrane structure
- iii. Oxidative phosphorylation
- iv. F₀-F₁ particles
- v. S-phase
- vi. Heterochromatin

- vii. Microtubules
- viii. Desmosomes
- ix. Facilitated transport

PART - III

Q.3. Answer any EIGHT of the following questions within 250 words each. [8x5=40]

- i. Prions
- ii. Differentiate active and passive transport
- iii. Cytoskeleton
- iv. Peroxisomes
- v. Chemiosmotic hypothesis.
- vi. Nucleolus
- vii. Differentiate between mitosis and meiosis
- viii. Nucleosome
- ix. Lysosomes
- x. Mycoplasma

PART – IV

Answer any FOUR of the following questions within 800 words each. [4x8=32]

- Q.4. Describe structure of a typical prokaryotic cell with neat labeled diagram. Add a note on differences between prokaryotes and eukaryotes
- Q.5. Describe structure and function of Golgi apparatus.
- Q.6. Describe mitochondrial respiratory chain and its importance.
- Q.7. Describe structure and function of nucleus.
- Q.8. Explain structure of GPCR and signaling through GPCR-cAMP pathway.

APRIL, 2026

Invertebrates: Protista to Echinodermata

Time -3 hours

Full marks-100

Figures in the right-hand side of margin indicates marks. Give illustrated diagrams wherever required.

PART - I

Q.1. Answer All the following questions.

[10x1=10]

- i. Most common method of reproduction in Protista is-----
- ii. Primary host of *Plasmodium vivax* is-----
- iii. Coelom is always lined by
 - a) Ectoderm b) Mesoderm c) Endoderm d) Epithelium
- iv. Ring like coral reef that encircles a lagoon is called -----.
- v. Only free-living larval stage of *Fasciola hepatica* is
 - a) Cercaria larva b) Miracidium larva c) Redia Larva d) Metacercaria larva
- vi. Define apolysis.
- vii. Infective stage of *Wuchereria bancrofti* is -----
- viii. Disease caused by *Ascaris lumbricoides* is commonly called-----
- ix. Excretory organs in Annelida is called-----
 - a) Flame cells b) Nephridia c) Contractile vacuole d) Body wall
- x. Respiratory organ of aquatic mollusc species is-----

PART - II

Q.2. Answer ALL the following questions within 50 words each.

[9x2=18]

- i. Pseudopodia
- ii. Metagenesis
- iii. Sexual dimorphism in *Ascaris*
- iv. Social castes in honey bee
- v. Tube feet

- vi. Metamerism
- vii. Elephantiasis
- viii. Bipinnaria larva
- ix. Coelom

PART - III

Q.3. Answer any EIGHT of the following questions within 250 words each. [8x5=40]

- i. Nutrition in protista
- ii. Spicules in sponges
- iii. Miracidium larva in *Fasciola hepatica*
- iv. Proglottids in *Taenia solium*
- v. Social life in termites
- vi. Torsion in Gastropods
- vii. Evolutionary significance of Trochophore larva
- viii. Vision in Arthropods.
- ix. Polymorphism in Cnidaria
- x. General characters of Protista.

PART – IV

Answer any FOUR of the following questions within 800 words each. [4x8=32]

- Q.4. Describe life cycle of *Plasmodium vivax* in body of Female Anopheles mosquito. Add a note on symptoms of malaria and its treatment strategies.
- Q.5. Give a brief account on parasitic adaptations of Helminthes.
- Q.6. What is metamorphosis? Describe metamorphosis in insects with examples.
- Q.7. Describe Water vascular system in Echinoderms. Add a note on its significance.
- Q.8. Give an account on coral reefs. Add a note on importance of corals.

APRIL, 2026
APICULTURE

Time -3 hours

Full marks-100

Figures in the right-hand side of margin indicates marks.
Give illustrated diagrams wherever required.

Part – I

1. Answer All the following questions.

[10x1=10]

- (i) Type of sex determination found in honey bee is:
a) ZW type b) XO type c) XY type d) Haplodiploidy
- (ii) Communication among honey bees is maintained by:
a) Dance and pheromones b) Sound production c) Colour change d) Touch
- (iii) Wax gland is well developed in which caste of honey bee of a colony?
a) Drone b) Worker c) Queen d) Larval stage
- (iv) Natural enemy of honey bee is:
a) Earthworm b) Silkworm c) Viruses d) Wax moth
- (v) The most suitable method for commercial honey production is:
a) Pressing by hand b) Boiling of the combs
c) Centrifugal extraction by honey extractor d) Crushing and straining
- (vi) Which of the following insects attack bee colony and consume honey?
a) Butterfly b) Housefly c) Ant d) Wasp
- (vii) Which bird is considered as the most common predator of honey bees?
a) Crow b) Sparrow c) Pigeon d) Bee-eater
- (viii) Which bee of the colony secretes royal jelly?
a) Queen bee b) Worker bee c) Drone bee d) All of the above
- (ix) Which of the following products of apiculture has antibacterial action?
a) Royal jelly b) Propolis c) Honey d) All of the above
- (x) Which of the following is not a product of apiculture?
a) Propolis b) Silk c) Honey d) Wax

Part – II

Q.2. Answer ALL the following questions within 50 words each.

[9x2=18]

- a) What are different castes of bees found in a honey bee colony?
- b) Mention two identifying features of the queen bee of a colony.
- c) What do you mean by swarming?
- d) What do you mean by artificial feeding of honey bees?

- e) Mention advantages of using movable frame hives over fixed-comb hives.
- f) Mention two preventive measures against diseases of honey bees.
- g) What are two symptoms of Nosema disease of honey bees?
- h) Mention two economic importances of beeswax.
- i) What are two medicinal uses of bee venom?

Part – III

Q.3. Answer any EIGHT of the following questions within 250 words each. [8x5=40]

- a) Describe the ploidy and functions of different castes of honey bees in a colony.
- b) Describe communication among honey bees maintained by round dance and waggle dance.
- c) Briefly mention the advantages and disadvantages of selecting *Apis mellifera* species for apiculture.
- d) Mention briefly about the accessories used with bee hive.
- e) Give a comparative account of traditional and modern bee hives.
- f) Describe the symptoms, causative organism and preventive measures of American Foulbrood disease of honey bees.
- g) What are different methods used to diagnose diseases of honey bees?
- h) Describe the economic importance of apiculture with reference to cross-pollination and agricultural productivity.
- i) Mention the commercial, medicinal and nutritional value of honey.
- j) Explain how artificial bee hives are important for scientific management of beekeeping.

Part – IV

4. Answer any FOUR of the following questions within 800 words each. [4x8=32]

- a) Write an essay on the social organization of the honey bee.
- b) Discuss different methods of extraction of honey. Add note on the nutritional value of honey.
- c) Explain briefly the diagnosis, prevention and control of major honey bee diseases.
- d) Discuss the role of apiculture in sustainable agriculture and environmental conservation.
- e) Explain the scientific approach of beekeeping practices to improve productivity and entrepreneurship in apiculture.
