

April, 2025
Microbiology(Major)

Time -3 hours

Full marks-100

Answer all questions. Give illustrated diagrams wherever required.

PART- I

Answer **all questions** with one word answer or fill in the blanks: **10x1 =10**

- a. Aristotle's notion of spontaneous generation is known as -----
- b. Penicillin is produced from fungi called -----
- c. Viruses capable of inducing tumours or neoplasms in animals are known as -----
- d. According to Margulis, eukaryotic cells arose by -----
- e. Archaeal flagella are commonly called -----
- f. Purity of holy Ganga is due to the presence of -----
- g. The plasmid enabling transfer of DNA between unrelated species is called -----
- h. All oncogenic RNA viruses belong to the family-----
- i. Retroviral enzymes are encoded by -----genes
- j. The severe decrease in ----- is a clinical hallmark of AIDS

PART – II

2. Answer **all** questions within maximum 50 words each: **9x2=18**

- a. Explain very briefly what are Probiotics?
- b. Write about general features of Bergey's manual?
- c. What are the surface appendages of Archaea?
- d. What do you mean by Broad spectrum antibiotics?
- e. What is the role of bacteria in nitrogen fixation?
- f. What is doubling time or generation time in microbial growth?
- g. Differentiate between gram positive and gram negative bacteria?
- h. What do you mean by tyndallisation?
- i. Draw a neat labelled diagram of ultrastructure of HIV

PART -III

3. Answer **any eight** questions within 250 words each. **8x5=40**

- a. Briefly describe the evidences in favour of the endosymbiotic theory.
- b. What are oncogenic viruses?
- c. Describe briefly what are continuous culture?
- d. State briefly nutrition in bacteria
- e. What is Lyophilization?
- f. What are retroviruses?
- g. What is growth media?
- h. What is Endospore in bacteria?
- i. Describe the mode of action of penicillin.
- j. What are antibiotics?

PART-IV

Answer **any four** questions with maximum 800 words each **4x8=32**

4. Describe the future aspects of microbiology.
5. Describe the process of genetic recombination in bacteria
6. Describe the morphology and pathogenicity of spirochaetes.
7. Describe briefly the types of vaccines.
8. Describe briefly the types and mechanism of action of microbial endotoxins

April,2025
Cell Biology(Major)

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** with one-word answer or fill in the blanks: **10x1=10**

- a) Type of cell without a true nucleus?
- b) Type of transport requiring energy?
- c) Structure that gives structural support to cell membrane?
- d) Cell organelle involved in lipid synthesis?
- e) The organelle rich in hydrolytic enzymes?
- f) Protein used in microtubule assembly?
- g) Hypothesis for mitochondrial origin?
- h) Organelle involved in fatty acid oxidation?
- i) Chromatin that is transcriptionally active?
- j) Which is a Second messenger for GPCR pathway?

PART – II

2. Answer **all** questions within maximum 50 words each: **9x2=18**

- a) Differentiate between prokaryotic and eukaryotic cells.
- b) What is the fluid mosaic model?
- c) What are intermediate filaments?
- d) Differentiate between rough and smooth ER?
- e) What is mtDNA?
- f) Name the sites of NADH and FADH₂ oxidation?
- g) Define oxidative stress?
- h) What is crossing over?
- i) What is autocrine signalling?

PART -III

3. Answer any eight questions within 250 words each. 8x5=40
- a) Describe the mechanisms of endocytosis and exocytosis?
 - b) Write notes on desmosome and tight junction?
 - c) Describe the function of Lysosome.
 - d) Compare the structure and functions of microtubules and microfilaments?
 - e) Write a note on the metabolic functions of peroxisomes?
 - f) Discuss how mitochondrial DNA differs from nuclear DNA?
 - g) Discuss the role of cAMP in signal transduction?
 - h) Explain the regulation of the cell cycle and the role of cyclins and CDKs?
 - i) Describe the types of membrane lipids and their functional significance?
 - j) Write notes on euchromatin and heterochromatin.

PART-IV

4. Answer any four questions with maximum 800 words each 4x8=32
- a) Explain the structure and functions of the plasma membrane in detail?
 - b) Explain the structure, functions, and biogenesis of the endoplasmic reticulum?
 - c) Describe the ultra structure and functions of mitochondria in detail?
 - d) Explain in detail the role of G-protein coupled receptors (GPCRs) in signal transduction?
 - e) Write an essay on cell cycle and its regulation.

April, 2025

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

1. Answer **all** with one-word answer or fill in the blanks: **10x1=10**

- a) The infective stage of Plasmodium in humans is called _____.
- b) The larval form of cnidarians is called _____.
- c) The internal cavity of sponges is known as the _____.
- d) _____ is the causative agent of filariasis.
- e) The excretory structure in flatworms is _____.
- f) The intermediate host for Fasciola is _____.
- g) Blood in arthropods is called _____.
- h) Vision in insects is provided by _____ eyes.
- i) The larval stage common to molluscs and annelids is _____.
- j) Octopus belongs to class _____.

PART – II

2. Answer **all** questions within maximum 50 words each: **9x2=18**

- a) What are the types of spicules according to their structure?
- b) What is schizogony?
- c) What is the role of amoebocytes?
- d) What are proglottids?
- e) Define pseudocoelomate?
- f) Define metamerism?
- g) What is ecdysis?
- h) What is a radula?
- i) What is Aristotle's lantern?

PART -III

3. Answer any **eight** questions within 250 words each. **8x5=40**

- a) Explain metagenesis with an example?
- b) What are the different types of coral reefs?
- c) Write about polyp and medusa forms in cnidarians?
- d) Describe the larval forms of *Fasciola hepatica* with diagrams.
- e) Describe the modes of infection and control of *Wuchereria bancrofti*?
- f) Describe metamorphosis in insects with examples?
- g) Describe the structure and functions of the nephridia in earthworm?
- h) Explain torsion and detorsion in gastropods?
- i) Describe bipinnaria and auricularia larva of echinoderms?
- j) Describe the structure of compound eyes in arthropods?

PART-IV

4. Answer **any four** questions with maximum 800 words each

4x8=32

- a) Describe the locomotory mechanisms in Protozoa with examples?
- b) Describe the structure and reproductive system of *Taenia solium*?
- c) Write a note on social behaviour in honey bees?
- d) Explain the water vascular system in echinoderms in detail?
- e) Discuss the lifecycle and pathogenicity of *Plasmodium vivax*?

**April, 2025
APICULTURE**

Time -3 hours

Full marks-100

Answer all questions. Give illustrated diagrams wherever required.

PART-I

1: Answer all questions.

10x1=10

- i. Which of the following species of honey bee is known as Giant honeybee?
a) *Apis florea* b) *Apis dorsata* c) *Apis laboriosa* d) *Apis mellifera*
- ii. Single-comb nests are characteristic of:
a) *A. dorsata* b) *A. florea* c) *A. mellifera* d) Both 'a' & 'b'
- iii. Largest amount of honey is produced by:
a) *A. florea* b) *A. mellifera* c) *A. dorsata* d) None of the above
- iv. Which of the following equipment is used to prevent queen bee from laying eggs in honey storage areas?
a) Hive tools b) Queen excluders c) Smokers d) Bee
- v. The method used for extraction of large quantity of honey is:
a) Centrifugal extraction b) Processing c) Squeezing d) All
- vi. Most common disease of adult honey bee caused by a protozoan parasite is:
a) Nosemosis b) Acarine c) Viral infection d) Varroa
- vii. Which of the following state in India is leading in honey production?
a) Tamil Nadu b) Jharkhand c) Uttar Pradesh d) Odisha
- viii. Royal jelly is secreted by:
a) Worker bee b) Queen bee c) Drone bee d) All of these
- ix. Which of the following is used in hive defense?
a) Bee wax b) Honey c) Propolis d) All of these
- x. Most common type of beehive used by beekeepers is:
a) Langstroth hive b) Top Bar hive c) Warre hive d) None

PART-II

2: Answer all questions within maximum 50 words each:

9x2=18

- i. Write about different members of bee colony.
- ii. Write shortly on bee pasturage.

- iii. Write shortly on indigenous method of extraction of honey.
- iv. Write shortly on diseases of adult stage of honey bee.
- v. What are bacterial diseases in honey bees?
- vi. What are modern methods of extraction of honey?
- vii. Mention briefly the preventive measures of honey bee diseases.
- viii. What are the advantages of artificial beehives?
- ix. Mention the benefits of bee pollen.

PART-III

3. Answer any **eight** questions within 250 words each. **(8x5=40)**

- i. Write shortly on social organisation of Bee colony.
- ii. What are different types of artificial bee hives?
- iii. Discuss different bee rearing processes in an Apiary?
- iv. Briefly mention the diseases of honey bees.
- v. Explain the disease control methods of the honey bee.
- vi. Justify the statement that use of artificial bee hives helps in cross pollination.
- vii. What are modern beekeeping equipment?
- viii. What are the conditions for selection of honey bees for apiculture?
- ix. What are the criteria for identification Apis and Non- Apis honeybee?
- x. Describe the role of artificial beehives for cross-pollination.

PART-IV

Answer **any four** questions with maximum 800 words each . **4x8=32**

4. Describe the biology of honey bee used in apiculture.
5. Briefly explain the different methods of extraction of honey.
6. Describe in detail of different diseases of honey bees and the preventive measures.
7. Explain in detail about the products of the apiculture industry and their economic importance.
8. Describe the artificial bee rearing process. Describe the structure of the Newton and Langstroth box used as beehives.

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