2024

(CBCS)

(4th Semester)

BOTANY

FOURTH PAPER

(Microbiology, Cytology, Genetics, Evolution)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. Name the type of bacteria which uses CO_2 as a sole source of carbon for growth.

(a) Organotrophs ( ) *(b)* Heterotrophs ( )

(c) Autotrophs ( ) *(d)* Lithotrophs ( )

2. The viral genome integrated into bacterial genome is called

(a) plasmids ( ) *(b)* prophage ( )

(c) capsid ( ) *(d)* tail fibre ( )

3. The major role of microbes in carbon cycle is

(a) breaking down of organic compound ( )

(b) chemosynthesis ( )

(c) photosynthesis ( )

(d) assimilation of nitrogen compounds ( )

4. Bacteriophage is discovered by

(a) d'Herelle ( ) (b) Frederick Griffith ( )

(c) Joshua Lederberg ( ) (d) Frederick W. Twort ( )

5. Nuclear DNA is prepared for replication in

(a) G1 phase ( ) (b) G2 phase ( )

(c) S phase ( ) (d) M phase ( )

6. The stage of prophase where chiasmata formation occurs is

(a) pachytene ( ) (b) zygotene ( )

(c) leptotene ( ) (d) diplotene ( )

7. Synapsis takes place between

(a) two homologous chromosomes ( )

(b) spindle fibre and centromere ( )

(c) mRNA and ribosomes ( )

(d) male and female gametes ( )

8. The strength of linkage between the two genes is determined by

(a) the number of chromosomes in a cell ( )

(b) the distance between them ( )

(c) the position of centromere ( )

(d) the frequency of crossing-over ( )

9. Hugo de Vries used _____ plants.

(a) *Oenothera lamarckiana* ( )

(b) *Pisum sativum* ( )

(c) Dog flower ( )

(d) *Antirrhinum* or Snapdragon ( )

10. Use and disuse theory was proposed by

(a) Darwin ( )

(b) Lamarck ( )

(c) Hugo de Vries ( )

(d) Stebbins and Haldane ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 15)

Write short notes on the following : 3×5=15

UNIT—I

1. Scope of microbiology

OR

2. Cell structure of bacteria

UNIT—II

3. Microbes in the production of enzymes

OR

4. Microbes in dairy product

UNIT—III

5. Complementary genes

OR

6. Euchromatin and Heterochromatin

UNIT—IV

7. Significance of meiosis

OR

8. Crossing-over and its significance

UNIT—V

9. Progressive and regressive evolution

OR

10. Mutation theory

(SECTION : C—DESCRIPTIVE)

(*Marks* : 50)

Answer the following : 10×5=50

UNIT—I

1. What is genetic recombination? Describe in brief the different types of genetic recombination in bacteria. 10

OR

2. Write short notes on the following : 5+5=10

(a) Morphological classification of bacteria

(b) Lytic cycle

UNIT—II

3. Define antibiotics. Briefly explain the different types of antibiotics. 2+8=10

OR

4. Briefly describe the following : 5+5=10

(a) Alcoholic beverages

(b) Microbes in nitrogen cycle

UNIT—III

5. Describe the different stages of mitosis with a well-labelled diagram. 10

OR

6. Write short notes on the following : 5+5=10

(a) Mendel's law of purity of gametes

(b) Ultrastructure of plant cell

UNIT—IV

7. What is sex determination? Describe the chromosome theory of sex determination. 2+8=10

OR

8. Define linkage. Explain in detail coupling and repulsion hypothesis. 2+8=10

UNIT—V

9. What do you mean by the term 'organic evolution'? Briefly describe the contribution of Darwin on evolution. 2+8=10

OR

10. Give an account of the theory of evolution as suggested by Lamarck. 10

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