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(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. The types of bacteria which can survive in extreme environments, such as hot springs are called

- (a) mesophiles ()
- (b) thermophiles ()
- (c) psychrophiles ()
- (d) halophiles ()

2. The bacterial cell wall is primarily composed of

- (a) cellulose ()
- (b) chitin ()
- (c) peptidoglycan ()
- (d) phospholipids ()

3. The process by which bacteria convert atmospheric nitrogen (N_2) into ammonia (NH_3) is called
- (a) nitrification ()
 - (b) denitrification ()
 - (c) nitrogen fixation ()
 - (d) ammonification ()
4. Which microorganism is responsible for the production of toxins in contaminated water that lead to algal blooms?
- (a) *Cyanobacteria* ()
 - (b) *Salmonella* ()
 - (c) *Clostridium* ()
 - (d) *Staphylococcus* ()
5. The cytoskeletal component which plays a role in cytokinesis (cell division) is
- (a) microtubules ()
 - (b) microfilaments ()
 - (c) intermediate filaments ()
 - (d) ribosomes ()
6. Complementary genes are a form of
- (a) simple Mendelian inheritance ()
 - (b) non-Mendelian inheritance ()
 - (c) multiple allele inheritance ()
 - (d) single-gene inheritance ()
7. Crossing over occurs during which phase of meiosis?
- (a) prophase I ()
 - (b) metaphase I ()
 - (c) anaphase II ()
 - (d) telophase I ()
8. Who first proposed the concept of linkage?
- (a) Gregor Mendel ()
 - (b) Thomas Hunt Morgan ()
 - (c) Charles Darwin ()
 - (d) Watson and Crick ()

9. Which principle is not a part of Lamarck's theory?
(a) Law of use and disuse ()
(b) Law of inheritance of acquired traits ()
(c) Struggle for existence ()
(d) Organisms adapt to their environment over time ()
10. According to de Vries, evolution occurs due to
(a) natural selection ()
(b) gradual accumulation of small variations ()
(c) sudden and large mutations ()
(d) genetic drift ()

(SECTION : B—SHORT ANSWERS)

(Marks : 15)

Write short notes on the following :

3×5=15

UNIT—I

1. Structure of a bacterial cell

OR

2. Structure of bacteriophages

UNIT—II

3. Microbes in water

OR

4. Microbes as biofertilizers

UNIT—III

5. Incomplete dominance

OR

6. Intragenic and intergenic interactions

UNIT—IV

7. Significance of crossing over

OR

8. Linkage map

UNIT—V

9. Law of use and disuse

OR

10. Objections to theory of evolution

(SECTION : C—DESCRIPTIVE)

(Marks : 50)

Answer the following :

10×5=50

UNIT—I

1. Give an account on bacterial transformation with diagram. 10

OR

2. Explain lysogenic and lytic cycles. 5+5=10

UNIT—II

3. Discuss the role of microbes in the production of antibiotics. 10

OR

4. Describe the role of microbes in nitrogen cycle with suitable diagram.

UNIT—III

5. Describe Mendel's laws of inheritance. 10

OR

6. Write a note on deviations from Mendel's laws.

UNIT—IV

7. Write, in detail, the chromosome theory of sex determination. 10

OR

8. Explain cytological basis of crossing over.

UNIT—V

9. Describe the theory of inheritance of acquired characters. 10

OR

10. Explain the theory of natural selection.
