2024

(CBCS)

(5th Semester)

BOTANY

SEVENTH PAPER

(Cytogenetics, Plant Breeding and Bioinformatics)

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. A cross-shaped pachytene configuration can be observed during meiosis in case of
   (a) deletion ( )
   (b) duplication ( )
   (c) inversion ( )
   (d) translocation ( )

2. The histone proteins which make up a nucleosome core are
   (a) H1, H2, H3 and H4 ( )
   (b) H1, H2A, H2B and H3 ( )
   (c) H2A, H2B, H3 and H4 ( )
   (d) H2A, H2B, H3A and H3B ( )

3. Trisomics were obtained for the first time by Blakeslee et al in

(a) *Datura stramonium* ( )

(b) *Oryza sativa* ( )

(c) *Nicotiana tabacum* ( )

(d) *Solanum indicum* ( )

4. The first man-made cereal crop is Triticale. The combination of parents involved in its production is *Triticum* and

(a) *Sorghum* ( )

(b) Rye ( )

(c) *Saccharum* ( )

(d) Oat ( )

5. Multiple alleles of a series

(a) always occupy the same locus in the chromosome ( )

(b) always occupy different loci in the same chromosome ( )

(c) always occupy different loci in different chromosomes ( )

(d) do not occupy any particular locus in the chromosome ( )

6. If a nibble is half a byte it will be equal to

(a) 4 bits ( )

(b) 8 bits ( )

(c) 12 bits ( )

(d) 16 bits ( )

7. When DNA sequences are aligned, identical sequence characters are known as

(a) indels ( )

(b) matches ( )

(c) mismatches ( )

(d) gaps ( )

8. Cytoplasmic male sterility in *Zea mays* is dependent on the

(a) male parent ( )

(b) female parent ( )

(c) both male and female parents ( )

(d) external factors ( )

9. Dimerization of thymine residue is brought by

(a) X-rays ( )

(b) beta rays ( )

(c) gamma rays ( )

(d) UV rays ( )

10. When a codon for an amino acid is mutated into a termination codon (UGA, UAA, UAG) it is called

(a) missence mutation ( )

(b) non-sense mutation ( )

(c) silent mutation ( )

(d) reverse mutation ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 15)

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

UNIT—I

1. Types of deletion

OR

2. Intermediate filaments

UNIT—II

3. Hyperploidy

OR

4. Consequences of autopolyploidy

UNIT—III

5. Genetic maps

OR

6. Self-sterility in plants

UNIT—IV

7. Radiation as mutagens

OR

8. Emasculation

UNIT—V

9. DNA database

OR

10. Bioinformatics

(SECTION : C—DESCRIPTIVE)

(*Marks* : 50)

Answer the following questions : 10×5=50

UNIT—I

1. What is structural chromosomal aberration? Give an account on inversion. Describe the genetical and cytological consequences of inversion. 2+2+6=10

OR

2. Give accounts of the following : 5×2=10

   (a) Structure of chromosome

   (b) Microfilaments

UNIT—II

3. Define polyploidy. Describe in detail the origin and production of allopolyploids citing at least two examples. 2+8=10

OR

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

(a) Monosomy

(b) Euploidy vs. Aneuploidy

UNIT—III

5. What do you mean by non-Mendelian inheritance? Explain plastid inheritance with suitable diagram. 2+8=10

OR

6. Briefly describe the following : 5×2=10

(a) Components of karyotype

(b) Enhancer and suppressor genes

UNIT—IV

7. What are mutagens? Write an account on chemical mutagens and their mechanism of action. 2+8=10

OR

8. Give accounts of the following : 5×2=10

(a) Pure-line selection

(b) Heterosis

UNIT—V

9. What is a protein database? Mention some important protein databases that you have studied. 2+8=10

OR

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

(a) Search tools

(b) Variants of BLAST

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