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(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. An acrocentric chromosome will have

(a) centromere on the proximal end ()

(b) centromere at the centre ()

(c) centromere near the centre ()

(d) centromere very close to one end ()

2. An inversion where the inverted segment does not include the centromere is

- (a) pericentric inversion ()
- (b) paracentric inversion ()
- (c) metacentric inversion ()
- (d) reciprocal translocation ()

3. The genomic formula of a monosomic is

- (a) $2n - 1$ ()
- (b) $2n - 2$ ()
- (c) $2n + 1$ ()
- (d) $2n + 2$ ()

4. An organism having two sets of chromosomes derived from two different species is known as

- (a) autopolyploid ()
- (b) allopolyploid ()
- (c) autotriploid ()
- (d) autotetraploid ()

5. The unit for measuring map distance is called

- (a) micrometer ()
- (b) millimeter ()
- (c) centimorgan ()
- (d) centimeter ()

6. A diagrammatic and graphical representation of relative distances between linked genes is called

- (a) linkage map ()
- (b) karyotype ()
- (c) karyogram ()
- (d) ideogram ()

7. The substitution of a purine with a pyrimidine base and vice versa is a

- (a) transition mutation ()
- (b) transversion mutation ()
- (c) frameshift mutation ()
- (d) reverse mutation ()

8. Frameshift mutation is caused by

- (a) transversion ()
- (b) transition ()
- (c) addition and deletion ()
- (d) addition and substitution ()

9. GenBank is a nucleic acid database maintained by

- (a) DNA Data Bank of Japan (DDBJ) ()
- (b) European Molecular Biology Laboratory (EMBL) ()
- (c) European Bioinformatics Institute (EBI) ()
- (d) National Center for Biotechnology Information (NCBI) ()

10. The first protein database was created by

- (a) Paulien Hogeweg ()
- (b) Margaret Dayhoff ()
- (c) David Lipman ()
- (d) William Pearson ()

(SECTION : B—SHORT ANSWERS)

(Marks : 15)

Write notes on the following :

3×5=15

UNIT—I

1. Microfilaments

OR

2. Translocation

UNIT—II

3. Segmental allopolyploidy

OR

4. Origin of allopolyploids

UNIT—III

5. Suppressor genes

OR

6. Uses of karyotype in evolution of species

UNIT—IV

7. Copy error mutations

OR

8. Pure line selection

UNIT—V

9. Bytes

OR

10. Protein database

(SECTION : C—DESCRIPTIVE)

(Marks : 50)

Answer the following questions :

10×5=50

UNIT—I

1. Give an account on the structure and chemical composition of chromosome. 5+5=10

OR

2. Write short notes on the following : 5+5=10
(a) Deletion and its consequences
(b) Structure and functions of microtubules

UNIT—II

3. Define aneuploidy. Mention the different types of aneuploidy. 2+8=10

OR

4. Write short notes on the following : 5+5=10
(a) Autopolyploidy
(b) Consequences of chromosomal anomalies

UNIT—III

5. Define multiple allelism. Describe self-sterility in plants with suitable example. 2+8=10

OR

6. Briefly describe the following : 5+5=10
(a) Plastid inheritance in *Mirabilis*
(b) Genetic maps

UNIT—IV

7. What is plant breeding? Describe the different steps involved in hybridization. 2+8=10

OR

8. Write short notes on the following : 5+5=10
(a) Ionizing radiations in mutations
(b) Heterosis

UNIT—V

9. What is biological database? Write an account on biological database for DNA data. 2+8=10

OR

10. Write accounts on the following : 5+5=10
(a) Search tools
(b) DNA sequence
