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(CBCS)

(5th Semester)

BOTANY

SEVENTH PAPER

(Cytogenetics, Plant Breeding and Bioinformatics)

Full Marks : 75

Time : 3 hours

(PART : A—OBJECTIVE)

(*Marks : 25*)

The figures in the margin indicate full marks for the questions

SECTION—A

(*Marks : 10*)

Tick (✓) the correct answer in the brackets provided :

1×10=10

1. The adjacent nucleosomes are connected by a

- (a) histone ()
- (b) chromatin ()
- (c) linker DNA ()
- (d) phosphate linkage ()

2. When a reunion restores the original sequence of genes in a chromosome, it is called

- (a) translocation ()
- (b) restituted breaks ()
- (c) non-restituted breaks ()
- (d) Okazaki fragments ()

- 3.** An individual lacking one chromosome from a diploid set ($2n - 1$) is called
 (a) monosomic () (b) nullisomic ()
 (c) haploid () (d) trisomic ()
- 4.** A polyploid organism which originates by combining complete chromosome sets from two or more species is known as
 (a) autopolyploid () (b) autoallopolyploid ()
 (c) allopolyploid () (d) multiple polyploid ()
- 5.** The visual characteristic that identifies a particular chromosome set of a species is
 (a) genetic map () (b) genotype ()
 (c) phenotype () (d) karyotype ()
- 6.** Alleles are
 (a) alternative forms of the same gene ()
 (b) alternative forms of different genes ()
 (c) two different genes ()
 (d) polymers of DNA ()
- 7.** The marked vigour or capacity for growth often exhibited by crossbred animals or plants is called
 (a) totipotency () (b) heterosis ()
 (c) polyploidy () (d) pure line selection ()
- 8.** The substitution of a purine with a pyrimidine and vice versa is a
 (a) transition mutation ()
 (b) transversion mutation ()
 (c) frameshift mutation ()
 (d) None of the above ()
- 9.** The search tool that compares a DNA query against a DNA database is
 (a) BLASTN () (b) TBLASTN ()
 (c) BLASTX () (d) BLASTP ()
- 10.** A bit has binary value of
 (a) 0 or 1 () (b) 1 or 2 ()
 (c) 2 or 3 () (d) 3 or 4 ()

SECTION—B

(Marks : 15)

Write short notes on the following :

3×5=15

1. Microtubules

OR

Deletion

2. Trisomy

OR

Polyploidy

3. Multiple allelism

OR

Cytoplasmic male sterility

4. Chemical mutagens

OR

Pure line selection

5. DNA data

OR

BLAST

(PART : B—DESCRIPTIVE)

(Marks : 50)

The figures in the margin indicate full marks for the questions

1. What are chromosomes? Elucidate the structure and chemical composition of chromosomes.

2+8=10

OR

Give an account of the following (any two) :

5×2=10

(a) Duplication and its consequences

(b) Cytoskeleton

(c) Translocations and its significance

2. What are numerical changes in chromosome? Give an account on sources and consequences of chromosomal anomalies. 2+8=10

OR

Give an account of the following (any *two*) : 5×2=10

- (a) Aneuploidy
- (b) Autopolyploidy
- (c) Segmental allopolyploidy

3. What is karyotype? Elucidate its role in systematics and evolution of species. 2+8=10

OR

Write short notes on any *two* of the following : 5×2=10

- (a) Self-sterility in plants
- (b) Plastid inheritance in *Mirabilis jalapa*
- (c) Enhancer and suppressor genes

4. What is plant breeding? Describe the technique and procedure of hybridization. 2+8=10

OR

Write short notes on any *two* of the following : 5×2=10

- (a) Hybrid vigour
- (b) Molecular basis of mutation
- (c) Physical mutagens

5. What is bioinformatics? Give a basic concept about data and information. 2+8=10

OR

Give an account of the following (any *two*) : 5×2=10

- (a) Search tools
- (b) DNA sequence analysis
- (c) Protein data

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