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(FYUGP)

(4th Semester)

BOTANY

(MINOR)

Paper : BCC/M4

(**Genetics**)

Full Marks : 75

Pass Marks : 40%

Time : 3 hours

*The figures in the margin indicate full marks
for the questions.*

(PART : A—OBJECTIVE)

(Marks : 25)

SECTION—I

(Marks : 15)

Choose the correct option :

1×15=15

1. A phenotypic trait in polygenic inheritance is controlled by

- (a) one gene
- (b) two genes
- (c) two or more genes
- (d) None of the above

2. Autosomes in humans occur in
 - (a) 46
 - (b) 45
 - (c) 23 pairs
 - (d) 22 pairs
3. The chromosome theory of inheritance was proposed by
 - (a) Sutton and Boveri
 - (b) Watson and Crick
 - (c) Both (a) and (b)
 - (d) None of the above
4. The tendency of genes present in the chromosome to stay intact and gets transferred to next generation is known as
 - (a) crossing-over
 - (b) pleiotropy
 - (c) epistasis
 - (d) linkage
5. Coefficient of coincidence measures
 - (a) interference
 - (b) probability
 - (c) epistasis
 - (d) linkage

6. Variegation in *Mirabilis jalapa* is due to
- (a) mutation
 - (b) cytoplasmic inheritance
 - (c) Mendelism
 - (d) lethal genes
7. Which of the following causes change in gene arrangement only?
- (a) Deletion
 - (b) Translocation
 - (c) Duplication
 - (d) Polyploidy
8. Down's syndrome is due to addition of one extra chromosome in
- (a) chromosome 20
 - (b) chromosome 21
 - (c) chromosome 22
 - (d) chromosome 23
9. Which of the following polyploids is sterile?
- (a) Apple
 - (b) Kiwi
 - (c) Maize
 - (d) Seedless watermelon

10. Colchicine treatment induces _____ in polyploidy.
- (a) chromosomal doubling
 - (b) crossing-over
 - (c) base substitution
 - (d) None of the above
11. Which of the following is a mutagen?
- (a) Nitrogen mustard
 - (b) DES
 - (c) MMS
 - (d) All of the above
12. The rate at which a specific allele appears within a population is called
- (a) genotype
 - (b) phenotype
 - (c) gene frequency
 - (d) allele
13. Hardy-Weinberg law is represented by
- (a) $p^2 + 2pq + q^2$
 - (b) $p^2 + 2pq + q^2 = 1$
 - (c) Both (a) and (b)
 - (d) None of the above

14. Which of the following factors brings about change in a population?

(a) Natural selection

(b) Mutation

(c) Genetic drift

(d) All of the above

15. The expected phenotypic ratio of a dihybrid cross in F_2 generation is

(a) 15 : 1

(b) 15 : 0

(c) 9 : 3 : 3 : 1

(d) 9 : 7

SECTION—II

(Marks : 10)

Write short notes on any *five* of the following :

2×5=10

1. Sex chromosome

2. Crossing-over

3. Three-factor cross

(6)

4. Duplication
5. Gene mutation
6. Genetic drift
7. Epistasis

(PART : B—DESCRIPTIVE)

(Marks : 50)

1. Explain lethal genes with examples. Add a note on multiple alleles. 6+4=10

Or

Write notes on the following : 5×2=10

(a) Probability

(b) Pleiotropy

2. Discuss infective heredity with examples. 10

Or

Write notes on the following : 5×2=10

(a) Recombination frequency

(b) Maternal effect

3. Write in detail about chromosomal mutation. 10

Or

Write notes on the following : $5 \times 2 = 10$

(a) Role of transposons

(b) Mutagens

4. Write notes on allele frequencies and genotype frequencies. 10

Or

Write notes on the following : $5 \times 2 = 10$

(a) Genetic variation

(b) Speciation

5. Discuss DNA repair mechanisms. 10

Or

Write notes on the following : $5 \times 2 = 10$

(a) Linkage

(b) Cytoplasmic inheritance

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