

Total number of printed pages-7

3 (Sem-3/CBCS) BOT HC 3

2022

**BOTANY**

(Honours)

Paper : BOT-HC-3036

**(Genetics)**

Full Marks : 60

Time : Three hours

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

1. Answer **any seven** of the following questions :  $1 \times 7 = 7$

(i) The transmission of characters or traits from one generation to another is called \_\_\_\_\_ .  
(Fill in the blank)

(ii) The genotypic ratio of law of independent assortment is—

(a) 1 : 1 : 1 : 1

(b) 9 : 3 : 3 : 1

(c) 9 : 3 : 3 : 3

(d) 3 : 9 : 1 : 3

(Choose the correct answer)

Contd.



(iii) When the phenotypic expression of a heterozygote is more extreme than that of either homozygous parent, then it is—

- (a) Co-dominance
- (b) Dominance
- (c) Overdominance
- (d) Incomplete dominance

*(Choose the correct answer)*

(iv) Genes which have little or no effect of their own but increase or decrease the expression of other major genes are known as—

- (a) Pleotropic genes
- (b) Modifying genes
- (c) Over dominant genes
- (d) Epistasis

*(Choose the correct answer)*

(v) Coupling and repulsion phases are two aspects of the same phenomenon called \_\_\_\_\_.

*(Fill in the blank)*

(vi) Autosomes are concerned with—

(a) Sex determination

(b) Body characters

(c) Femaleness

(d) Maleness

*(Choose the correct answer)*

(vii) Y-linked genes are called \_\_\_\_\_.

*(Fill in the blank)*

(viii) \_\_\_\_\_ is the change in frequency of an existing gene variant in the population due to random chance.

*(Fill in the blank)*

(ix) The loss of a segment of genetic material from a chromosome is termed as—

(a) Duplication

(b) Deficiency

(c) Translocation

(d) Inversion

*(Choose the correct answer)*

(x) \_\_\_\_\_ is the smallest unit of DNA capable of recombination.

*(Fill in the blank)*

(xi) \_\_\_\_\_ refers to the number of processes by which a cell identifies corrects damage to the DNA molecules that encode its genome.

*(Fill in the blank)*

(xii) Nullisomic is represented by—

(a)  $2n - 2$

(b)  $2n + 1 + 1$

(c)  $2n + 1$

(d)  $2n + 2$

*(Choose the correct answer)*

2. Answer **any four** out of the following questions :  $2 \times 4 = 8$

(i) What are tetrasomics ?

(ii) What are sex chromosomes ?

(iii) What are exons ?

- (iv) What is the difference between complete and incomplete linkage ?
- (v) What is pseudo-dominance ?
- (vi) What is the purpose of a pedigree analysis ?
- (vii) What is genetic variation ?
- (viii) Differentiate between Mendelian and non-Mendelian inheritance.
3. Write short notes on **any three** of the following : 5×3=15
- (i) Frameshift mutation
- (ii) Epistasis
- (iii) Mitochondrial DNA
- (iv) Intercalating Agents
- (v) Transposons
- (vi) Speciation
- (vii) Spontaneous mutation
- (viii) Multiple Alleles

4. Answer **any three** of the following questions :  $10 \times 3 = 30$

(i) What are Mendel's law? Describe Mendel's second law with a suitable example.  $2+8=10$

(ii) What is crossing over? Describe the cytological basis of crossing over with a suitable example.  $2+8=10$

(iii) Explain with the help of diagram meiotic behaviour of paracentric and pericentric inversion.  $5+5=10$

(iv) What do you mean by extra chromosomal inheritance? Describe with an example.  $2+8=10$

(v) Define aneuploids. Discuss the causes of origin of aneuploids.  $2+8=10$

(vi) With the help of suitable example discuss polygenic inheritance.

(vii) What is induced mutation? Give a detailed account of physical mutagens.  
2+8=10

(viii) Describe Hardy-Weinberg's law.

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