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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 :  $5 \times 3 = 15$

(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.