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 : 1×7=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)

(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 : 2×4=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 : 10×3=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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