3 (Sem–3/CBCS) BOT HC 3

2023

BOTANY

(Honours Core)

Paper : BOT–HC–3036

(Genetics)

Full Marks : 60

Time : Three hours

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

1. Answer the following questions :　　1×7=7

   (a) What is the difference between complete and incomplete penetrance ?

   (b) What is the importance of speciation ?

   (c) _____ are the substances which have almost similar structure and can substitute bases in DNA strand.

(d) The ability of a molecule to exist in more than one chemical form is called _____ .

(e) _____ and _____ proposed one gene–one enzyme hypothesis in 1948.

(f) Each gene occupies specific position called _____ .

(g) _____ is the change in frequency of an existing gene variant in the population due to random chance.

2. Answer the following questions briefly :

$2 \times 4 = 8$

(a) Who categorised gene into cistron, recon and muton ? Is cistron a functional unit of DNA ?

(b) Differentiate between euploidy and aneuploidy.

(c) How does linkage affect recombination ?

(d) Differentiate between mit. DNA and nuclear DNA.

3. Write short notes on **any three** of the following : 5×3=15

   (a) Salient features of Chromosome theory of heredity

   (b) Crossing over

   (c) DNA Repair mechanism

   (d) Translocation

   (e) Hardy Weinberg law

4. Answer **any three** of the following question : 10×3=30

   (a) Is Extranuclear Inheritance, Mendelian ? Explain the phenomenon with the help of examples. 1+9=10

   (b) What is point mutation ? Describe the various types of point mutations with the help of examples. 2+8=10

   (c) "A crossing over in paracentric inversion results in formation of one acentric chromatid and a dicentric chromatid." Explain in detail with the help of diagram.

(d) Distinguish between autosomes and sex chromosomes. Discuss in detail sex-linked inheritance.   3+7=10

(e) Why did Mendel select pea plant as his experimental material? State the reasons for his success. When pink flowered plants were crossed, they produced white and red flowered plants. Explain the phenomenon.   2+2+6=10

(f) "Coupling and repulsion phases are two aspects of the same phenomenon." Name the phenomenon and justify the statement.

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