

This question paper contains 4+1 printed pages]

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S. No. of Question Paper : 5985

Unique Paper Code : 107693

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Name of the Paper : Genetics and Genomics—II [GGHT-602]

Name of the Course : B.Sc. (Hons.)

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt Five questions in all.

Question No. 1 is compulsory.

1. (i) Give *one* word for the following statements :

5×1=5

- (a) A small clear zone in a lawn of bacterial cells on a solid agar plate.
- (b) Study of gene functions based on RNA or possible proteins they encode.
- (c) In *Drosophila*, a transposable DNA element responsible for hybrid dysgenesis.
- (d) A decrease in viability, vigor or growth in progeny after several generations of inbreeding.
- (e) Genes expressed in contiguous domains along the anterior-posterior axis of the *Drosophila* embryo that regulate the process of segmentation in each domain.

P.T.O.

(ii) Define the following terms (attempt any *four*) :

4×1=4

(a) Clade

(b) Genome

(c) Lysogeny

(d) Proteomics

(e) Inbreeding

(f) Morphogen.

(iii) Expand the following abbreviations (attempt any *five*) :

5×1=5

(a) MSA

(b) BLAST

(c) Hfr

(d) PDB

(e) SINE

(f) OMIM

(g) UTR.

(iv) Differentiate between the following pairs (attempt any *three*) : 3×2=6

- (a) Auxotroph and Prototroph
- (b) Maternal effect and Zygotic genes
- (c) Ecological and Ethological Isolation
- (d) Composite and Non-composite Transposons.

(v) Give *one* contribution of each of the following Scientistis : 6×½=3

- (a) Frederick Griffith
- (b) Christine Nüsslein Volhord
- (c) Craig J. Venter
- (d) Joshua Lederberg and Edward Tatum
- (e) Th. Dobzhansky
- (f) Motoo Kimura.

(vi) Give reasons for the following : 4×1=4

- (a) It is easier to identify spontaneous mutation in bacteria than in most eukaryotes.

- (b) Retrotransposon uses reverse transcriptase for transposition.
- (c) Recombinants produced from Hfr × F<sup>-</sup> are generally F<sup>-</sup>.
- (d) Allele frequencies change in open populations.
2. (i) Discuss ABC model of floral development in *Arabidopsis thaliana*. 6
- (ii) What functions do homeotic genes of plants and animals have in common? 3
- (iii) With the help of a diagram show mechanism of replicative transposition of Tn3 element. 3
3. (i) Discuss Hardy-Weinberg's law and its applications. 8
- (ii) Explain allopatric speciation giving examples. 4
4. (i) What is genomics? How microarrays are valuable for transcriptome analysis? 7
- (ii) Compare features of prokaryotic and eukaryotic genomes. 5
5. (i) Discuss transformation experiments used in mapping studies. 6
- (ii) Describe Benzer's experiment on complementation analysis. 6
6. Distinguish between the following pairs (attempt any *three*): 3×4=12
- (a) Disruptive and stabilizing selection

(b) Generalized and Specialized Transduction

(c) Ortholog and Paralog genes

(d) SINEs and LINEs.

7. Write short notes on (attempt any *three*) :

3×4=12

(a) Human Genome Project

(b) Genetic Drift

(c) Ac/Ds elements

(d) Sequence alignment

(e) NCBI.