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S. No. of Question Paper : **9556**

Unique Paper Code : **2533012010**

Name of the Paper : **Principles of Genetics**

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

Semester : **VII**

Duration : **2 Hours**

Maximum Marks : **60**

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

Attempt any *five* questions.

All questions carry equal marks.

Attempt all parts of the question together.

1. (a) Write the contributions of the following scientists (any *four*) in the field of Genetics : 1.5×4=6

(i) T.H. Morgan

(ii) Alfred Sturtevant

(iii) Ruth Sager

(iv) Barbara Mc Clintock

(v) Carl Correns.

P.T.O.

(2)

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(b) Define the following terms (any *three*) :

2×3=6

(i) Genotype

(ii) Allele

(iii) Organelle heredity

(iv) Genepool.

2. Differentiate between the following terms :

3×4=12

(i) Continuous and discontinuous variations

(ii) X-linked inheritance and autosomal inheritance

(iii) Independent assortment and linkage

(iv) Nuclear and extranuclear inheritance.

3. (a) Define infectious heredity. Explain with reference to inheritance of kappa particles in *Paramecium*. 6

(b) Comment on Johannsen pure line theory. 3

(c) What are the Mendel's three laws of inheritance ? 3

4. (a) What is complementary genes interaction ? Give their expected phenotypic ratio and discuss by giving example of flower color in *Lathyrus odoratus*. 5

(b) Describe the genetic inheritance mechanism associated with variegation in four o'clock plant. 5

(c) Define narrow sense heritability and how is it calculated ? 2

5. Write short notes on the following terms :

4×3=12

- (i) Maternal inheritance
- (ii) Polygenic inheritance
- (iii) Recessive epistasis.

6. (a) Define Hardy Weinberg principle. How is it used to calculate allele and genotype frequencies in population ?

6

- (b) Rough eyes (r), Ebony body color (e) and brevis bristles (b) are three recessive mutations that occur in fruit flies. A fly with rough eyes, ebony body, and brevis bristles is crossed with a fly that is homozygous for the wild-type traits. The resulting F1 females are test-crossed with males that have rough eyes, ebony body, and brevis bristles; the following progenies are produced :

offspring phenotype	count
$r^+ e^+ b^+$	625
$r e b$	625
$r e^+ b$	167
$r^+ e b^+$	167
$r^+ e^+ b$	95
$r e b^+$	95
$r e^+ b^+$	13
$r^+ e b$	13
Total	1800

Determine the order of the genes and the map distances between them.

Calculate interference and write its significance.

3+2+1=6

