

[This question paper contains 2 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1997

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Unique Paper Code : 2533012010

Name of the Paper : Principles of Genetics (DSE)

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

Semester : VI

Duration : 2 Hours

Maximum Marks : 60

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt any Five questions.
3. **All** question carry equal marks.
4. Attempt **all** parts of the question together.

Q1 (a) Write the contributions of the following scientists (**any two**) in the field of Genetics: **(2X2=4)**

- (i) Conrad Waddington
- (ii) Tracy Sonneborn
- (iii) T.H. Morgan

(b) Define the following terms (**any four**): **(2X4=8)**

Back cross, Non-disjunction, Synteny, Plasmagones, Monohybrid cross

Q2 Differentiate between the following (**any three**) : **(4X3=12)**

- i. Dominant and recessive alleles
- ii. Broad-sense and narrow-sense heritability
- iii. Codominance and multiple allelism
- Iv. Gene interaction and epistasis.

Q 3 (a) What is the significance of *Mirabilis jalapa* in cytoplasmic inheritance studies? Explain. **(8)**

(b) How can penetrance affect phenotypic ratios in genetic crosses? **(4)**

P.T.O.

Q4 (a) Colour blindness is an X-linked recessive trait. A carrier female marries a normal male. Calculate the probability of: (2+2=4)

(i) Colour-blind son (ii) Carrier daughter

(b) Explain factors disturbing Hardy–Weinberg equilibrium. Discuss the applications of Hardy–Weinberg law in population genetics. (8)

Q 5 (a) Discuss the experimental design and outcome of Mendel's monohybrid and dihybrid crosses. (7)

(b) What is meant by linkage? Explain with reference to chromosomal behaviour during meiosis? (5)

Q 6 (a) Explain complementation test and its applications in genetics. (5)

(b) In *Drosophila melanogaster*, three recessive mutant genes, yellow body (*y*), white eye (*w*), and miniature wing (*m*) were studied using a three-point test cross. The following progeny were obtained

<i>y w m</i>	350
<i>+++</i>	340
<i>y++</i>	40
<i>+wm</i>	38
<i>yw+</i>	90
<i>++m</i>	92
<i>y+m</i>	25
<i>+w+</i>	25

Determine the order of these genes and the map distances between them. Calculate interference and write its significance. (5+2=7)