This question paper contains **3** printed pages]

Roll No. | | | | | | | | | | | |

S. No. of Question Paper : **5643**

Unique Paper Code : **2533012010**

Name of the Paper : **Principles of Genetics (DSE)**

Name of the Course : **Microbiology**

Semester : **VI, (Part-III)**

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.

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

   (*i*) T.H. Morgan

   (*ii*) Mary B. Mitchell

   (*iii*) Tracy Sonneborn

   (*iv*) Barbara Mc Clintock

   (*v*) Hugo de Vries

   (*b*) Define the following terms (any *four*) : 4×2=8

   (*i*) Heritability, (*ii*) Non-dijunction, (*iii*) Pseudodominance, (*iv*) Linkage, (*v*) Synteny

P.T.O.

2. (*a*) What is incomplete dominance ? Explain with an example. 3

(*b*) Explain Polygenic inheritance with a suitable example. 5

(*c*) Explain maternal inheritance with reference to *Limnaea peregra*. 4

3. Differentiate between the following pairs : 3×4=12

(*i*) Backcross and Testcross

(*ii*) Polygenic inheritance and monogenic inheritance

(*iii*) Monohybird and dihybrid cross

(*iv*) Incomplete Penetrance and Variable Expressivity.

4. (*a*) Define Hardy Weinberg principle. How is it used to calculate allele and genotype frequencies in population ? 5

(*b*) Explain dominant epistasis with an example. 4

(*c*) What are multiple alleles ? Explain with *one* example. 3

5. (*a*) Explain X-Linked inheritance with a suitable example. 4

(*b*) Explain the mechanism of extranuclear inheritance in *Mirabilis jalapa*. 4

(*c*) Which test is done to determine whether the two independently isolated mutations are in the same gene or in separate genes ? 4

6. (*a*) Define Epigenetics and explain any *one* mechanism of epigenetic changes. 2

(*b*) Define kappa particles and its role in infectious heredity with suitable diagrams. 4

(*c*) Consider Apricot eyes (*a*), Ebony body color (*e*) and mini bristles (*m*) as three recessive mutations in fruit flies. A fly with apricot eyes, ebony body, and mini bristles is crossed with a fly homozygous for the wild-type traits. The resulting F1 females are then test-crossed with males having apricot eyes, abony body, and mini bristles. The following progenies are produced :

$a^+ \ e^+ \ m^+$	625
$a \ e \ m$	625
$a \ e^+ \ m$	167
$a^+ \ e \ m^+$	167
$a^+ \ e^+ \ m$	95
$a \ e \ m^+$	95
$a \ e^+ \ m^+$	13
$a^+ \ e \ m$	13
Total	1800

(*i*) Determine the gene order for the three genes.

(*ii*) Construct a genetic map showing the distances between these genes in map units

(*iii*) Calculate the coefficient of coincidence (COC) and interference (I).

2+2+2=6