This question paper contains 3 printed pages]

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

S. No. of Question Paper : **99**

Unique Paper Code : **216555** **G**

Name of the Paper : **Genetics and Genomics (LSPT-512)**

Name of the Course : **B.Sc. (Prog.) Life Sciences**

Semester : **V**

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 including

Question No. **1** which is compulsory.

All questions carry equal marks.

1. (*a*) Define any *five* of the following : 5×1=5

   (*i*) Back mutation

   (*ii*) Auxotroph

   (*iii*) Map unit

   (*iv*) Pleiotropy

   (*v*) Trisomy

   (*vi*) Synteny.

   (*b*) Give *one* contribution of each of the following scientists : 5×1=5

   (*i*) T. Fairchild

   (*ii*) C. Ventor

   (*iii*) M. Lyon

   (*iv*) C. Stern

   (*v*) C. Correns.

P.T.O.

(*c*) Fill in the blanks : 5×1=5

(*i*) The karyotype of a person suffering from Turner's syndrome is ..... .

(*ii*) Colour blindness is an example of ..... inheritance.

(*iii*) ..... is a cross of F_1 hybrid with homozygous recessive parent.

(*iv*) When purine is replaced by purine it is called ..... .

(*v*) Genetic exchange between non-sister chromatids is called ..... .

2. Differentiate between any *three* of the following : 3×5=15

(*i*) Paracentric and Pericentric inversion

(*ii*) Physical and Chemical mutagen

(*iii*) Coupling and Repulsion

(*iv*) Dominant and Recessive epistasis.

3. Write notes on any *five* : 5×3=15

(*i*) Human Genome Project

(*ii*) Deletion and its significance

(*iii*) Sex determination in *Melandrium*

(*iv*) Barr body

(*v*) Induced Polyploidy

(*vi*) Tautomerism.

4. (*a*) In plant red flower colour (R) is dominant over white (r) and smooth seed (S) is dominant over wrinkled seed(s). When a red flowered and smooth seeded plant is crossed to a red flowered and wrinkled seeded plant. one of the phenotypes in the progeny breeds true for white flowers and wrinkled seeds.

(*i*) Determine the genotype of the parents.

(*ii*) Determine what gametes may be formed by the P1 parents.

(*iii*) What are the genotypes and phenotypes of F_1 generation ?

(*iv*) Explain the genetic basis of the cross. 10

(*b*) This question has multiple options as correct answers. This needs to be factored while marking the answers :

In a family, there are four children. One child has blood group A and the other has B.

(*i*) What are the 'possible' genotypes of the parents ?

(*ii*) Draw a pedigree chart. 5

5. (*a*) Describe Morgan's discovery of linkage in *Drosophila* and explain its significance. 10

(*b*) What is Frame-shift mutation ? Explain its mechanism. 5

6. (*a*) What is reciprocal translocation ? Illustrate with the help of diagrams. Explain the significance. 10

(*b*) How can we use recombination frequencies in generating linkage maps. 5

7. (*a*) Describe Cytoplasmic inheritance in plants citing *two* examples. 10

(*b*) Describe *E.coli* as a model organism. 5