This question paper contains 4 printed pages]

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

S. No. of Question Paper : **8358**

Unique Paper Code : **LSPT-512 : 216555** **C**

Name of the Paper : **Genetics and Genomics**

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

Attempt any *four* questions from the rest. *All* questions carry equal marks.

Q1. (A) Define the following: 5×1= 5

(*i*) Barr bodies

(*ii*) Phenocopy

(*iii*) Idiogram

(*iv*) Proteomics

(*v*) Base analog.

(B) Explain the following : 5× 2=10

(*i*) What are the effects of ionizing radiations ?

(*ii*) What are the symptoms of Phenylketonuria (PKU) Syndrome ?

P.T.O.

(*iii*) In line with Bridge's genic balance theory for sex determination. What is the expected sex of individual with each of the following chromosome arrangements ?

(*a*) 4×4A

(*b*) 3×4A

(*c*) 2×3A

(*d*) 1×3A.

(*iv*) What is the importance of Functional Genomics ?

(*v*) If a mother carried sex linked gene for green colour vision and the father was normal, would their sons or daughters be defective in colour vision. Explain.

2. Differentiate between any *five* : 5×3=15

(*i*) Test cross *Vs* back cross

(*ii*) Deletion *Vs* Duplication

(*iii*) Paralogs *Vs* Orthologs

(*iv*) Dominance *Vs* Epistasis

(*v*) Autopolyploidy *Vs* Allopolyploidy

(*vi*) Somatic mutation *Vs* Germinal mutation.

3. Write short notes on the following (any *three*) : 3×5= 15

(*i*) C/B method for detection of mutation

(*ii*) Criss cross inheritance

(*iii*) Chromosomal Theory of Inheritance

(*iv*) Shotgun Sequencing

(*v*) Model Organisms.

4. (*i*) Short hair (S) in rabbits is dominant over long hair (s). The following crosses are carried out, producing the progeny shown. Give all possible genotypes of the parents in each cross :

	Parents	**Progeny**
(*a*)	short × short	4 short and 2 long
(*b*)	short × short	8 short
(*c*)	short × long	12 short
(*d*)	short × long	3 short and 1 long

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(*ii*) What do you understand by ABO blood group series ? How does these series justify multiple allelism ? Can parents with A and O blood group produce a child with AB blood groups ? 7

5. (*i*) How is sex determined in *Drosophila and Melandrium* ? 8

(*ii*) What is hereditary syndrome ? Discuss causes and consequences of Down's, Turner and Klinefelter syndrome. 7

P.T.O.

6. (*i*) What is linkage? How does linkage differ from independent assortment of genes ? Distinguish between complete and incomplete linkage. Define linkage group. 8

(*ii*) Describe the inheritance pattern and basis for leaf colour in *Mirabilis jalapa.* 7

7. (*i*) What is inversion ? How can paracentric and pericentric inversions act as crossover suppressor ? What are the consequences of inversions ? 8

(*ii*) Name any *three* chemical mutagens and their role in mutations ? 6

(*iii*) What determines the map distance between the genes in a linkage map ? 1