(b) What are "jumping genes"? Diagrammatically illustrate the cointegrate model of transposition of Tn3 elements. (6)

6. (a) Explain how the somatic cell hybridization technique is used for mapping genes. (8)

(b) Differentiate between sex limited and sex-linked traits with examples. (4)

7. Write short note on any **three** of the following : (3×4=12)

(i) Bombay phenotype

(ii) Dosage compensation

(iii) Benzer's complementation test

(iv) Position effect

(v) Chromosomal number aberrations

[This question paper contains 6 printed pages.

Your Roll No.....

Sr. No. of Question Paper : 1054

Unique Paper Code : 32231502

Name of the Paper : B.Sc. (Honours) Zoology

Name of the Course : **Principles of Genetics-LOCF**

Semester : V

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **five** questions in all, including question No. **1** which is compulsory.

1. (i) Define any **five** of the following : (5)

(a) Tautomeric shift

(b) Barr body

(c) Test cross

(d) Idiogram

(e) Sexduction

(f) Chiasma

(ii) Fill in the blanks: (5)

(a) Genes that affect the viability of organisms are termed as _____

(b) The sex of Drosophila is _____ when X:A ratio is greater than 1

(c) When a chromosome segment is reversed 180°, it causes _____ mutation

(d) _____ elements in *Drosophila* causes hybrid dysgenesis

(e) Bacterial cells that are able to take up naked DNA in the process of transformation are known as _____ cells

gm fruit weight is crossed with a homozygous plant with 50 gm fruit weight. In the F_2 generation of 128 plants, 2 plants have a fruit weight of 20 gm, and 2 plants have fruit weight of 50 gm, and the rest of the plants have fruit weights between 20gm and 50gm.

(i) On the basis of this data, determine how many genes control the fruit weight.

(ii) Determine the genotypes and fruit weights of the progeny of a back cross between an F_1 plant and a plant with 50 gm fruit weight. (2+5)

4. (a) Diagrammatically explain the process of bacterial transduction and differentiate between generalized and specialized transduction. (8)

(b) Explain the genetic basis of shell coiling in *Limnea peregra*. (4)

5. (a) Discuss sex determination in *Drosophila*. (6)

(v) Differentiate between the following pairs **(any 4)** : (8)

(i) Pleitropic and Polygenic traits

(ii) Conservative and Replicative transposition

(iii) Nonsense and Missense mutation

(iv) Penetrance and Expressivity

(v) Auxotroph and Prototroph

2. (a) How does epistatic interaction modify the Mendelian dihybrid ratio? Explain with 3 suitable examples. (6)

(b) Describe Muller's experiment to demonstrate the role of X-rays as mutagens. (6)

3. (a) With a suitable experiment, discuss the cytological basis of crossing over. (5)

(b) In a hypothetical plant species, fruit weight is a polygenic character. A homozygous plant, with 20

(iii) Expand the abbreviations **(any five)** : (5)

(i) PKU

(ii) SRY

(iii) ITR

(iv) RTF

(v) HAT

(vi) C1B

(iv) What are the contributions of the following scientists **(any four)** : (4)

(i) Barbara Mc Clintock

(ii) Karpechenko

(iii) T.H. Morgan

(iv) Margret Kidwell

(v) Carl Correns

P.T.O.