(c) How can you distinguish between the terms haploidy and monoploidy? How can haploids be produced and utilized in plant breeding? (5)

[This question paper contains 8 printed pages.]

Your Roll No. .....

Sr. No. of Question Paper : 1418

Unique Paper Code : 32161303

Name of the Paper : Genetics

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

Semester : III

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. All Questions carry equal marks.
3. Question No. **1** is compulsory.
4. Attempt five questions in all including **Question No. 1.**

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

(i) Pseudodominance

(ii) Frameshift mutation

P.T.O.

(iii) Trisomy

(iv) Epigenetics

(v) Dicentric chromosome

(vi) Transposon (1×5=5)

(b) Give one contribution of (any five) of the following

(i) Carl Correns

(ii) Barbara McClintock

(iii) Sutton and Boveri

(iv) R. C. Punnett

(v) Hugo de Vries

(vi) Alfred Strutevant (1×5=5)

(c) Fill in the blanks:

(i) Human females have _____ linkage groups.

(i) Which classes represent the parental types? (2)

(ii) Which classes reflect the occurrence of single cross overs and double cross overs? (2)

(iii) Construct the genetic map of the 3 loci involved indicating both map distance and correct gene sequence. (5)

(iv) What is the coefficient of coincidence involved? Also find out the degree of interference. (3)

(b) What is Position effect? Explain with the help of a suitable example. (3)

7. (a) Explain the inheritance of skin color in humans (5)

(b) What do you understand by ABO blood group series? Explain its genetic basis of inheritance. (5)

P.T.O.

6. (a) An individual heterozygous at three gene loci *Aa, Nn, Rr* is crossed with the homozygous recessive parent aa nn rr . The frequency of progeny with different genotypes is as follows:

ANR	347
ANr	52
Anr	357
Anr	90
AnR	49
AnR	6
a NR	92
a Nr	7
Total progeny	1000

(ii) Double monosomy is represented as _____.

(iii) Short legged breed of sheep was named as _____ by Seth Wright.

(iv) _____ is an example of sex- linked recessive trait.

(v) When a gene affects many aspects of phenotype, it is said to be _____.

(1×5=5)

2. Write short notes on **(any five)** of the following

(i) Photoreactivation repair

(ii) Base Analogs

(iii) Dominant Epistasis

(iv) *cis trans* complementation test

P.T.O.

(v) Retrotransposons

(vi) Reciprocal translocation

(vii) Mitochondrial inheritance in Yeast (3×5=15)

3. Differentiate between **(any five):**

(i) Penetrance and Expressivity

(ii) Codominance and Incomplete Dominance

(iii) Test cross and Reciprocal cross

(iv) Paracentric and Pericentric inversion

(v) Allopatric and Sympatric speciation.

(vi) Down's syndrome and Klienefelter's syndrome

(3×5=15)

4. (a) In pea plant, Tall (T) is dominant over dwarf (t), Yellow seed (Y) is dominant over green (y) and Round seed (R) is dominant over wrinkled seed (r). A homozygous dwarf, green and wrinkled pea plant is crossed to a homozygous tall, yellow and round plant. Using forked line method give the genotypes and phenotypes of parents, F_1 and F_2 progenies. (8)

(b) Give an account of the inheritance of Kappa particles in *Paramecium* with diagrams. (7)

5. (a) In a population of 5000, cystic fibrosis is seen in 125 individuals. How many individuals in the population are the carrier of the gene for cystic fibrosis? (5)

(b) Mutations are caused by both environmental and chemical insults. Describe how chemical mutagens induce mutations. Give two examples of useful induced mutations in crop improvement. (10)

P.T.O.