

This question paper contains 4 printed pages]

Roll No.

--	--	--	--	--	--	--	--	--	--

S. No. of Question Paper : 8554A

Unique Paper Code : 216/223/589

C

Name of the Paper : GGHT-501 : Genetics and Genomics-I

Name of the Course : B.Sc. (Hons.) Anth./Bot./Bio-Chem./Bio-Med./Microbiology/Zoology

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.

1. (A) Define any five :

5

- (i) Proband
- (ii) Hemizygous
- (iii) Frameshift mutation
- (iv) Homologous chromosomes
- (v) Pleiotropy
- (vi) Monosomy

(B) Expand the abbreviations (any four) :

4

- (i) QTL
- (ii) 2-AP
- (iii) HGPRT

P.T.O.

(iv) SRY

(v) C1B

(C) Give important contributions of any *five* of the following

5

(i) Sutton and Boveri

(ii) R.C. Punnett

(iii) T.H. Morgan

(iv) Boris Ephrussi

(v) Carl Correns

(vi) Karl Landsteiner

(D) Fill in the blanks (any *five*) :

5

(i) The phenomenon in which a red-flowered snapdragon and a white-flowered snapdragon produce only pink-flowered offspring is called .....

(ii) Alleles of different genes that are on the same chromosome may occasionally be separated by a phenomenon known as .....

(iii) An alkaloid used to arrest mitotically dividing cells in metaphase is .....

(iv) Convention to indicate identical twins in a pedigree .....

(v) Karyotype of Klinefelter's syndrome .....

(vi) Cytological condition in which chromosomes fail to separate at the time of cell division is called .....

2. Differentiate between any *four* of the following :

14

- (i) Penetrance and expressivity
- (ii) Euploidy and aneuploidy
- (iii) Epistasis and dominance
- (iv) Gynandromorphs and intersex
- (v) Reciprocal cross and test cross

3. In *D. melanogaster*, cherub wings (*ch*), black body (*b*), and cinnabar eyes (*cn*) result from recessive alleles that are all located on chromosome 2. A homozygous wild-type fly was mated with a cherub, black, and cinnabar fly, and the resulting F1 females were test-crossed with cherub, black, and cinnabar males. The following progeny were produced from the testcross :

$ch\ b^+cn$	105
$ch^+ b^+cn^+$	750
$ch^+ b\ cn$	40
$ch^+ b^+cn$	4
$ch\ b\ cn$	753
$ch\ b^+cn^+$	41
$ch^+b\ cn^+$	102
$ch\ b\ cn^+$	5

- (a) How do you say the genes are linked ? 2
- (b) Determine the linear order of the genes on the chromosome. 3
- (c) Construct the chromosomal map. 6
- (d) Determine the coefficient of coincidence and interference . 3

P.T.O.

- 4 (a) Give an account of chromosomal mutation involving changes in number of genes and position of genes. 10
- (b) Explain briefly how visible mutations are detected by attached X method. 4
5. (a) Describe the mechanism of sex determination in humans. Explain how is it different from that in *Drosophila* ? 10
- (b) Add a note on environmental factors affecting sex determination. 4
6. (a) How do you calculate the number of polygenes ? Add a note on transgressive variation. 7
- (b) A pure sinistral female snail is crossed with a pure dextral male snail. Give the appearance of F1 with reasons. Give the phenotype of F2 . 7
7. Write short notes on any *four* : 14
- (i) Bombay phenotype
  - (ii) Cytological evidence of crossing over
  - (iii) Dosage compensation
  - (iv) Null hypothesis
  - (v) Somatic cell hybridization
  - (vi) Lethal genes.