WEST BENGAL STATE UNIVERSITY

B.Sc. Honours 5th Semester Examination, 2020, held in 2021

ZOOACOR12T-ZOOLOGY (CC12)

GENETICS

Time Allotted: 2 Hours | Full Marks: 40

The figures in the margin indicate full marks.
Candidates should answer in their own words and adhere to the word limit as practicable.
All symbols are of usual significance.

1. Answer any ***eight*** questions from the following: 2×8 = 16

(a) What are the different traits of the pea plant that Mendel used in plant breeding experiments?

(b) State what type of Mendelian inheritance leads to Sickle Cell Anaemia and Haemophilia.

(c) What are recombination hotspots?

(d) What type of mutation is seen in case of Down's syndrome and Klinefelter's syndrome? Mention the choromosomes that are affected.

(e) During recombination of genes *x*, *y* and *z*, double crossover did not occur at all. What will be the percent of interference and coefficient of coincidence?

(f) What will be the sexual type in *Drosophila* which has —
(i) three (3) X chromosomes and two (2) autosomes
(ii) three (3) X chromosomes and three (3) autosomes

(g) What is point mutation? Give an example.

(h) What is the function of the cis-trans test in genetics?

(i) Define epistasis.

(j) What are class I and class II transposable genetic elements? Give an example of each.

(k) Differentiate between the process of transformation and transduction in bacteria.

(l) What are the different types of linkage?

(m) What is the composition of an insertion sequence (IS)?

(n) State the law of independent assortment.

(o) What are gynandromorphs?

2. Answer any ***three*** questions from the following: 3×3 = 9

(a) The ABO blood group system is an example of incomplete dominance or co-dominance Explain briefly. 3

(b) Discuss about the pattern of sex-linked inheritance. 3

(c) Explain the three types of point mutations-silent, mis-sense and nonsense mutation with example. 1+1+1

(d) Define Incomplete dominance and Co-dominance with example. $1\frac{1}{2}+1\frac{1}{2}$

(e) What is the F-factor and how does it help in conjugation in bacteria? 3

(f) What is Alu element and its importance? 2+1

3. Answer any ***three*** questions from the following: 5×3 = 15

(a) What are the different types of chromosomal aberrations? Discuss with examples. 5

(b) Define cistron and recon. What is conditional lethal mutation? 3+2

(c) Discuss the role of *sxl*, *tra* and *dsx* genes in the male sex determination pathway in *Drosophila*. 2+1+2

(d) (i) What is the purpose of performing a test cross in breeding experiments? 1+4

(ii) Mr. and Mrs. Jones have six (6) children. Three (3) of them have attached earlobes (recessive trait) like their father and the other three (3) children have free earlobes like their mother. What are the genotypes of Mr. and Mrs. Jones and all their children?

(e) What is the function of transposase? Discuss the role of Ac-Ds system of transposable genetic elements with respect to seed colour in maize. 2+3

(f) In a three-point testcross following data are obtained: 2+3

ABC	abc	aBc	AbC	ABc	abC	aBC	Abc
230	240	96	104	138	142	12	8

Find out the correct linear order of genes and calculate recombination values.

N.B. : *Students have to complete submission of their Answer Scripts through E-mail / Whatsapp to their own respective colleges on the same day / date of examination within 1 hour after end of exam. University / College authorities will not be held responsible for wrong submission (at in proper address). Students are strongly advised not to submit multiple copies of the same answer script.*

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