



WEST BENGAL STATE UNIVERSITY  
B.Sc. Honours 5th Semester Examination, 2023-24



**ZOOACOR12T-ZOOLOGY (CC12)**

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

- What is a base analog and why are some mutagenic?
- Calculate the number of Barr bodies in female having the genotype of 2A+XXXX.
- Write down the sexual phenotypes of *Drosophila* and human having chromosome complement AA, XXY.
- What is horizontal gene transfer and how might it take place?
- State the difference between the dosage compensation mechanism between man and that of *Drosophila*.
- What do you mean by extrachromosomal inheritance? Give an example.
- What is competence? What is its role in transformation?
- What is the purpose of performing a test cross?
- What is haplotype?
- What do you mean by coefficient of coincidence?
- What is an intersex fly?
- State the function of TRA and TRA2.

2. Answer any **three** questions from the following:

3×3 = 9

- In humans, a dimple in the chin is a dominant characteristic controlled by a single gene. A man with a chin dimple and a woman who lacks the dimple produce a child who lacks a dimple. What is the man's genotype?
- What is Robertsonian translocation (RT)? How does RT lead to Down Syndrome?
- How does sex determination in *Drosophila* differ from sex determination in humans?
- Design an experiment to prove that crossing over leads to linkage.
- Distinguish between  $F^+$ ,  $F^-$ , Hfr and  $F'$  cells.

3. Answer any **three** questions from the following:

- (a) *Drosophila* females of wild-type appearance but heterozygous for three autosomal genes are mated with males showing the three corresponding autosomal recessive traits: glassy eyes, coal coloured bodies and striped thoraxes. One thousand (1000) progeny of this cross are distributed in the following phenotypic classes:

Wild type	27
Striped thorax	11
Coal body	484
Glassy eyes, coal body	8
Glassy eyes, striped thorax	441
Glassy eyes, coal body, striped thorax	29

Draw a genetic map based on these data.

- (b) What is meant by missense mutation? Briefly describe the molecular basis of a human genetic disorder resulting from 8 such mutation. Add a note on its inheritance pattern.

1+3+1

- (c) In a maternity ward, four babies become accidentally mixed up, the ABO types of the four babies are known to be O, A, B and AB. The ABO types of the four sets of parents are determined. Indicate which baby belongs to each set of parents:

- AB×O,
- A×O,
- A×AB and
- O×O.

- (d) What is polygenic inheritance? Assume that there are three genes (each with two alleles) for different shades of human skin colour; genes AA, BB, EE produce darkest skin and genes aa, bb, ee produce lightest skin. What would be the predictive skin colour allele combinations if genes assort independently?

1+4

- (e) What is hybrid dysgenesis? Why it does not occur when crossing P strain females with M strain males?

3+2

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