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# The Assam Royal Global University, Guwahati

Royal School of Life Sciences

M. Sc Zoology 3<sup>rd</sup> Semester

Semester End Examination, January 2023

Course Title : Genetics and Cytogenetics

Course Code : ZOO144C301

Time: 3 Hours

Maximum Marks: 70

**Note: Attempt all questions as per instructions given.**

*The figures in the right-hand margin indicate marks.*

## Section – A

1. Attempt **all** questions. (Maximum word limit 50) 2 x 8
- Define linkage. How many linkage groups are there in normal human male?
  - What do you mean by epistasis? Give an example of dominant epistasis.
  - What is satellite DNA? What is its significance.
  - Name two diseases occurred due to change in chromosome number in human.
  - What is Barr body? What is its significance.
  - What is genic balance theory?
  - What do you mean by G-banding of chromosomes? Mention its practical significance.
  - What is the genetic makeup of an individual suffering from Down syndrome?

## Section – B

2. Attempt **any one** of the following: 12 x 1
- Poplar is a dioecious plant. A wild plant with 3 genes AABBCc was crossed with a triple recessive mutant aabbcc. The F1 male hybrid (AaBbCc) was then back crossed with the triple mutant and the phenotype recorded are as follows-
- |        |     |
|--------|-----|
| AaBbCc | 300 |
| aaBbCc | 100 |
| aaBbcc | 16  |
| AabbCc | 14  |
| AaBbcc | 65  |
| aabbCc | 75  |
| aabbcc | 310 |
| Aabbcc | 120 |
- Find out the distance in map unit between the genes A to B and B to C.
- Describe in details the different types of epistatic gene interaction with examples.
3. Attempt **any two** of the following: 7 x 2
- Write a note on highly repetitive DNA sequences.
  - State the different types of chromosomal aberrations in human?
  - Describe in short that how UV light exposure leads to gene mutation?
4. Attempt **any two** of the following: 7 x 2
- Write the role of histone methylation in epigenetic alterations in DNA
  - How the sex of Drosophila is determined? Add a note on it.
  - Write a note on dosage compensation.
5. Attempt **any two** of the following: 7 x 2
- Explain the different types of chromosome banding techniques?
  - What is heterochromatin and euchromatin? How these are differs from non-coding regions of the DNA?
  - Write a note on “cry du chat” syndrome.