

BZYCT-137

ASSIGNMENT BOOKLET

**Bachelor's Degree Programme
(BSCG)
GENETICS AND EVOLUTIONARY BIOLOGY**

Valid from 1st January, 2023 to 31st December, 2023



**School of Sciences
Indira Gandhi National Open University
Maidan Garhi
New Delhi-110068
(2023)**

Dear Student,

Please read the section on assignments in the Programme Guide for Core Courses that we sent you after your enrolment. A weightage of 30 per cent, as you are aware, has been earmarked for continuous evaluation, **which would consist of one tutor-marked assignment** for this course. The assignment is in this booklet, and it consists of two parts, Part A and B. The total marks of all the parts are 100, of which 35% are needed to pass it.

Instructions for Formatting Your Assignments

Before attempting the assignment please read the following instructions carefully:

- 1) On top of the first page of your answer sheet, please write the details exactly in the following format:

ROLL NO.:

NAME:

ADDRESS:

.....

.....

COURSE CODE:

COURSE TITLE:

ASSIGNMENT NO.:

STUDY CENTRE: **DATE:**

PLEASE FOLLOW THE ABOVE FORMAT STRICTLY TO FACILITATE EVALUATION AND TO AVOID DELAY.

- 2) Use only foolscap size writing paper (but not of very thin variety) for writing your answers.
- 3) Leave 4 cm margin on the left, top and bottom of your answer sheet.
- 4) Your answers should be precise.
- 5) Complete each of Part A and Part B of this assignment separately, and **submit them together.**
- 6) The assignment answer sheets are to be submitted to your Study Centre as per the schedule made by the study centre. **Answer sheets received after the due date shall not be accepted.**

We strongly suggest that you retain a copy of your answer sheets.

- 7) This assignment is **valid from 1st January, 2023 to 31st December, 2023.** If you have failed in this assignment or fail to submit it by December, 2023, then you need to get the assignment for the year 2024, and submit it as per the instructions given in the Programme Guide.
- 8) **You cannot fill the exam form for this course** till you have submitted this assignment.

We wish you good luck.

ASSIGNMENT
GENETICS AND EVOLUTIONARY BIOLOGY

Course Code: BZYCT-137
Assignment Code: BZYCT-137/TMA/2023
Maximum Marks: 100

Note: Attempt all questions. The marks for each question are indicated against it.

Part-A

Maximum Marks: 50

1.
 - i) How is co-dominance different from incomplete dominance? (5)
 - ii) Explain the phenomenon of masking the expression of gene by another in epistasis. (5)

2.
 - i) In *Drosophila*, the recessive, sex-linked genes abnormal eyes facet (*fa*) and singed bristles (*sn*) show 18 percent recombination. (5)
 - a) If a singed male is crossed to a $\frac{fa^+}{fa^+}$ female, what phenotypes are expected in the F_1 ? (5)
 - b) If the F_1 males and females are inbred what phenotypic proportions would be expected to occur in F_2 males and females? (5)
 - ii) Two recessive genes *ds* and *mp* are present in corn. These are linked and are 20 map units apart. From the cross:
$$\frac{ds\ mp}{++} \times \frac{ds\ +}{+mp}$$

What percentage of the progeny would be expected to be both *ds* and *mp* in the phenotype? (5)

3.
 - a) In the following statements choose the alternate correct word given in parenthesis. (7)
 - i) The DNA regions in chloroplast could be observed under (light microscope/electron microscope).
 - ii) The regions containing *cpDNA* are called (nucleoids/celluloids).
 - iii) Each nucleoid contains (a single/a few) copies of DNA.
 - iv) The *cpDNA* and *mtDNA* are usually (circular/linear) in nature.
 - v) Both chloroplast and mitochondria contain (a few/many) copies of DNA.
 - vi) The *mtDNA* of yeast is (bigger/smaller) than *mtDNA* of humans.
 - vii) The occurrence of introns is discovered in (yeast/human).

- b) Which among the following statements are correct? (3)
- i) Mitochondria contain 80 S ribosomes.
 - ii) The mRNA encoded by nuclear genes for the smaller subunit of rubisco is translated in the chloroplast.
 - iii) The inheritance of chloroplast genome is independent of nuclear genome.
4. i) Explain why sterility is common in polyploid organisms? (5)
- ii) What is trisomy? By what mechanisms does it come into existence? (5)
5. i) Define mutation. Explain the following types of mutations briefly: (5)
- (a) Induced mutations
 - (b) Suppressor mutations
- ii) What are transposable genetic elements? How they can cause mutations? (5)

Part-B

Maximum Marks: 50

6. Explain Neo Darwinism and Neo Lamarckism in detail. (10)
7. i) Industrial melanism is an excellent model to demonstrate the natural selection in action. Analyse the above statement critically. (5)
- ii) What do you understand by sexual selection. Illustrate your answer with a suitable example. (5)
8. What is Isolation and what are its types? Explain. (10)
9. Answer in about 50 words each. (10)
- a) Explain the concept of geographical isolation with suitable examples.
 - b) How does habitat preference of organisms promote speciation process?
 - c) Cite an example to show that highly restricted breeding seasons of populations contribute to isolation process.
 - d) Discuss the role played by courtship behavior and scents in the isolation process.
 - e) Distinguish the terms interspecific sterility and hybrid sterility.
10. Analyse the causes and influence of big five mass extinctions. (10)