

2024

BOTANY — HONOURS

Paper : CC-10

(Genetics)

Full Marks : 50

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

1. Answer **any five** questions from the following :

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|---|-----|
| (a) What is the concept of complete linkage in genetics? | 2 |
| (b) State the difference between Mendelian dominance and epistasis. | 2 |
| (c) Distinguish between aneuploidy and polyploidy. | 2 |
| (d) What is meant by homeotic genes? Give an example. | 1+1 |
| (e) With a suitable example define alkylating agents. | 2 |
| (f) What is meant by tandem repeats? Give an example. | 1+1 |
| (g) Write briefly what is meant by Ac/Ds elements. | 2 |
| (h) Define split gene. | 2 |

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

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|---|-----|
| (a) Write an account on one gene one polypeptide concept. | 5 |
| (b) Illustrate overlapping gene with suitable example. | 5 |
| (c) What are the different types of trisomy? Explain with sketches, the meiotic behaviour in trisomic individual. | 2+3 |
| (d) What is inversion? Distinguish between the meiotic behaviour of paracentric and pericentric inversion. | 1+4 |

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

- | | |
|--|-------|
| (a) Describe Holliday model to explain the molecular mechanism of recombination with neat sketches. | 10 |
| (b) What do you understand by frameshift mutation? How does uv-ray cause mutation? Explain one way of reverting the effect of uv-induced mutation. | 3+3+4 |

Please Turn Over

(2)

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- (c) In Chinese primrose, slate coloured flower (s) is recessive to blue flower (S); red stigma (r) is recessive to green stigma (R); and long style (l) is recessive to short style (L). The F_1 of a cross between true breeding plants, when test crossed gave the following progenies :

Slate flower	green stigma	short style	27
Slate flower	red stigma	short style	85
Blue flower	red stigma	short style	402
Slate flower	red stigma	long style	977
Slate flower	green stigma	long style	427
Blue flower	green stigma	long style	95
Blue flower	green stigma	short style	960
Blue flower	red stigma	long style	27

- (i) Find out the gene order and map distance between the genes.
- (ii) Find out the interference. (2+6)+2
- (d) Illustrate reciprocal translocation. Write briefly about the origin and evolution of any crop species through polyploidy. 3+7
- (e) Write the molecular mechanism of tautomerisation and deamination. 5+5
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