

M.Sc. 3rd Semester Examination, 2024

BOTANY

PAPER — BOT-301.1 & 301.2

Full Marks : 50

Time : 2 hours

Answer all questions

The figures in the right hand margin indicate marks

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

PAPER : BOT-301.1

(Cell Biology and Genetics)

GROUP — A

Answer any two of the following : 2 × 2

(Turn Over)

(2)

1. How individuals with double cross overs in respect of two expressions of two characters are identified on the field ?
2. Why all kinds of extranuclear inheritance show the influence of maternal parents and how ?
3. How does 'spindle attachment checkpoint' work ?
4. Mention two unique features of nucleolus of plant cells.

GROUP – B

Answer any **two** of the following : 4 × 2

5. Illustrate the nuclear pore complex ultrastructure and mention the roles of Nesprin 1, 2, 3 and 4.
6. Describe different kinds of behaviours of polygenes in inheritance.

7. Explain infectious heredity with the transmission of virulence in *Paramoecium*.
8. Give a comprehensive account of the roles of different cyclins and cdks from the G1 phase prior to the initiation of mitotic stages.

GROUP – C

Answer any **one** of the following : 8×1

9. How to distinguish between Sex influenced traits and Sex limited traits ? Elucidate different types of sex determinations. $2 + 6$
10. Explain different conditions and phenomena that lead to narrow genetic base of a newly developed population from a larger population of wide genetic base. Elaborate Hardy-Weinberg theory in the context of both of allelic and genotype frequency. $4 + 4$

(4)

PAPER : BOT-301.2

(*Biotechnology*)

GROUP – A

Answer any **two** of the following : 2×2

- 11.** Name a reporter gene and state its nature of functioning in genetic engineering.
- 12.** Explain the nature of advantage obtained by using cosmid.
- 13.** What is the propeller twist of DNA ?
- 14.** Why is plant introduction considered a breeding method ?

GROUP – B

Answer any **two** of the following : 4×2

15. Describe the constitution of BAC. How does it differ from YAC ? 2 + 2
16. Contrast the B form and Z form of DNA in respect of at least 4 features.
17. Enumerate the major steps for constructing genomic library.
18. Why 'Pure line variety' is named so ? How and at which point of breeding method is the purity achieved ? 2 + 2

GROUP – C

Answer any **one** of the following : 8 × 1

19. Illustrate the mechanism of DNA replication mentioning the respective roles of the enzymes engaged in it. 8

(6)

- 20.** Give a schematic account of shoot tip multiplication. Define shoot apex culture and state its significance. 4 + 4

[Internal Assessment – 10 Marks]
