

**M.Sc. 4th Semester Examination, 2024**

**BOTANY**

PAPER—BOT-402.1 & 402.2

*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*

**BOT-402.1**

[Marks : 20]

**GROUP – A**

Answer any two questions :  $2 \times 2$

1. Write down the role of TEMED in PAGE.
2. What is affinity chromatography ?

3. What are different components required in PCR mixture ?
4. Mention a condition where two different distributions show same median but different modes.

GROUP – B

Answer any **four** questions :  $2 \times 4$

5. Explain the principle and applications of spectrophotometer.
6. Describe HPLC with its operation.
7. Write down principle and applications of Atomic Force Microscope.
8. How is the dispersion of a set of data with respect to two parameters, expressed ? Show its relationship with standard error.  $3 + 1$

GROUP – C

Answer any **one** question :  $8 \times 1$

9. Write down two applications each of the following instruments :  $2 \times 4$

(a) Thin layer chromatography

(b) Bioreactor

(c) Lyophilizer

(d) GC

10. How is the Chi square test for goodness of fit of Fixed ratio hypothesis performed ?

**BOT-402.2**

[Marks : 20]

GROUP – A

Answer any **two** questions from the following :  $2 \times 2$

1. Write down any two objectives of bioinformatics.
2. Distinguish between local and global sequence alignment.
3. Write the full form of NCBI and EMBL.
4. Name two online tools used for primer designing.

GROUP – B

Write short notes on any two from the following :

4 × 2

5. Protein structural database
6. Basic rules for primer design
7. Methods for protein structure prediction
8. BLAST.

GROUP – C

Answer any **one** question from the following :

8 × 1

9. What is multiple sequence alignment? Discuss on the different methods of multiple sequence alignment. Mention the application of MSA. 1 + 5 + 2
10. Why is homology modelling also known as comparative modelling? Describe the steps of homology modelling to get a valid protein structure. 2 + 6

[ Internal Assessment – 10 Marks ]

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**BOTANY**

PAPER – BOT-402(B)

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**GROUP – A**

Answer any **four** questions of the following : 2 × 4

1. Mention the significance of glycoproteins on the surface of cell membrane.
2. How are the cyclins and cdks related ?

3. What kind of genes are determining the quantitative traits ? How do they create gradations in expression ?
4. What do the loops of lampbrush chromosome signify ? Where is it found ?
5. What is the bottleneck effect of a population ?
6. How is the microtubule constituted of ?

GROUP – B

Answer any **four** questions of the following :  $4 \times 4$

7. Write the ultrastructural features of chloroplast.
8. Elaborate the different stages of Meiotic prophase-I.
9. Give a brief account of cytoskeleton.

10. Describe polytene chromosome and comment on its significance.
11. Elaborate the role of polyploidization and reduction of chromosome size in the chromosomal evolution of angiosperm.
12. How does quantitative genetics differ from mendelian genetics ?

GROUP – C

Answer any two questions of the following :  $8 \times 2$

13. Illustrate the constancy of allele frequency suggested by the Hardy Weinberg principle. Draw the relationship between the bottle neck effect, genetic drift and founder effect. 4 + 4
14. Describe the allopatric and sympatric speciation.



( 4 )

15. Characterize B chromosome. Comment on their possible origin. 6 + 2

16. Describe the basic structure of the ultrastructure of cell membrane.

**[ Internal Assessment – 10 Marks ]**

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