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V – 5460

Reg. No. : .....

Name : .....

Fourth Semester M.Sc. Degree Examination, June 2025

Botany

BO 241 – BIOINFORMATICS AND BIOPHYSICS

(2019 Admission Onwards)

Time : 3 Hours

Max. Marks : 75

I. Answer the following questions.

1. What is *Flybase*?
2. Expand EMBOSS.
3. Name any two mass analyzers used in mass spectroscopy.
4. What is *PSI-Pred*?
5. Name the first sequenced eukaryotic genome.
6. Distinguish between inter-molecular and intra-molecular hydrogen bonding.
7. Give one example each for anionic and cationic exchange resin.
8. Name the region of electromagnetic spectrum for nuclear magnetic resonance.
9. The 'FT' in FT-IR stands for what?
10. Write down the unit of absorbed dose of radiation.

(10 × 1 = 10 Marks)

P.T.O.



II. Answer the following questions in not more than 50 words.

11. (a) Explain the principle of isopycnic centrifugation.

OR

(b) Comment on the purpose of optical filters in a fluorescence microscope.

12. (a) Discuss the working principle of STM.

OR

(b) Comment on the different reagents and buffers with their purpose for vertical gel electrophoresis.

13. (a) Comment on the features and organization of a biological database.

OR

(b) write a note on phylogenetic analyses tools citing suitable examples.

14. (a) Compare global and local alignment.

OR

(b) Write a note on structural genomics.

15. (a) Comment on the features of Autodock.

OR

(b) Explain the principle of flow cytometry.

(5 × 2 = 10 Marks)



III. Answer the following questions in not more than 150 words.

16. (a) Write a note on protein sequence and structure databases citing suitable examples.

OR

- (b) Write a note on information retrieval from biological databases.

17. (a) Give an account of the applications of metabolomics.

OR

- (b) Explain the role of computers in various steps of drug designing.

18. (a) Write a short note on transcriptomics and its applications.

OR

- (b) Explain the significance of pharmacogenomics in personalized medicines.

19. (a) Describe the electrophoresis of nucleic acids.

OR

- (b) Describe the technique of isoelectric focusing.

20. (a) Discuss the principles and applications of NMR spectroscopy.

OR

- (b) Discuss the principles and applications of flow cytometry.

21. (a) Write a note on major radioactive isotopes used in biological experiments.

OR

- (b) Explain the technique of liquid scintillation counting. Add a note on the scintillation cocktail.



22. (a) Explain the different kind of rotors and centrifuges. Add a note on RCF.

OR

(b) Write a note on structure based drug design.

**(7 × 5 = 35 Marks)**

IV. Answer the following questions in not more than 250 words.

23. (a) Write a detailed account on the principle, instrumentation, components and working of HPLC. Add a note on its advantages and applications.

OR

(b) Discuss the principles, procedure and applications of FISH and GISH in detail.

24. (a) Write an essay on protein structure prediction methods.

OR

(b) Write an essay on sequence alignment.

**(2 × 10 = 20 Marks)**

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