

(6 pages)

S.No. 6149

P 22 BTE 3 A

(For candidates admitted from 2022–2023 onwards)

M.Sc. DEGREE EXAMINATION, NOVEMBER 2023.

Bio Technology – Elective

**BIostatistics, Bioinformatics, Bioethics
AND IPR**

Time : Three hours

Maximum : 75 marks

SECTION A — (20 marks)

Answer ALL questions.

I. (A) Multiple Choice Questions. (5 × 1 = 5)

1. In a histogram of interval data, the x-axis represents.
(a) Frequency (b) Data values
(c) Standard deviation (d) Skewness
2. In the context of bio informatics, what does the term “genome project” refer to?
(a) A study of the human genome only
(b) Sequencing a specific gene
(c) An effort to sequence the DNA of an entire species
(d) A project to create new organisms through genetic modification

3. What is the main purpose of molecular databases in bio informatics?
(a) Collecting physical DNA samples
(b) Storing and providing access to biological data
(c) Generating new genetic sequences
(d) Analyzing metabolic pathways
4. Which of the following is an example of a bio ethical issue in agriculture?
(a) Climate change
(b) Animal welfare in research
(c) Genetically modified organisms (GMOs)
(d) Human genetic engineering
5. What does the concept of “prior art” refer to in the context of patents?
(a) Art created before the invention
(b) Art that follows the invention
(c) A patent attorney’s previous work
(d) Art that remains unpatented

(B) Fill in the Blanks.

(5 × 1 = 5)

6. Count data examples in biological research include bacterial cell count, radioactivity count, and _____.
7. The basic programming skills in bio informatics are essential for automating data _____ and analysis processes.
8. System biology takes an _____ approach, aiming to understand complex biological systems as a whole.
9. One of the basic approaches to ethics involves evaluating actions based on their _____ consequences.
10. The term "patent _____" refers to the legal protection given to an improvement or modification of an existing patented invention.

II. Answer ALL questions.

(5 × 2 = 10)

11. Describe the construction process of a histogram for interval data and its significance in data visualization.
12. What are the key functions of a genome project and its impact on our understanding of genetics?
13. Define the concept of molecular databases?
14. Define the concept of bioethics.
15. Explain the concept of "prior art" and its importance?

SECTION B — (5 × 5 = 25)

Answer ALL questions.

16. (a) Discuss the role of standard deviation and standard error in statistical analysis?

Or

- (b) Explain the principles of regression and correlation coefficient analysis.

17. (a) Discuss the significance of basic programming skills in bio informatics with the suitable examples?

Or

- (b) Discuss the importance of computational biology and bioinformatics in biotechnology.

18. (a) Define systems biology and elaborate on how it combines wet lab and dry lab experiments to study complex biological systems with examples ?

Or

- (b) Differentiate between wet lab and dry lab experiments in the context of systems biology.

19. (a) Discuss the role of bioethics in wildlife conservation and management.

Or

- (b) Define ethics and discuss its role and importance in biology.
20. (a) Discuss the precautions and considerations involved in the patenting process, including disclosure vs. non-disclosure, time frames, and costs associated with patent applications.

Or

- (b) Explain in detail about the WTO and IPR provisions under TRIPS.

SECTION C — ($3 \times 10 = 30$)

Answer any THREE questions.

21. Discuss the differences and applications of the Chi-square test, Duncan's multiple range test, and Turkey's post hoc assay in biostatistics.
22. Describe the impact of bioinformatics on modern biology and biotechnology. Discuss specific bioinformatics applications in biotechnology and their potential benefits and limitations?
23. Provide a comprehensive overview of reductionist and integrative approaches in biology, focusing on how they influence research strategies, and discuss the implications of each approach in understanding complex biological systems?

24. Discuss the commercialization of scientific research and its ethical implications, focusing on the relationship between scientific advancements and commercial interests, and the ethical standards required to balance these interests?

25. Provide a comprehensive overview of the evolution of global intellectual property rights, including the role of GATT and WTO, and the IPR provisions under TRIPS.
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