R7295	Sub. Code
	502301

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Third Semester

Bioinformatics

GENETICS AND GENETIC ENGINEERING

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. Explain the scope of genetics.

2. Define monohybrid crosses with suitable example.

3. What is Rh factor and why is it important?

4. What is the difference between autosomal dominant and autosomal recessive?

5. Define replication and list out four steps involved in the replication.

6. What are 3 uses of recombinant DNA?

7. What is the function of a tumor suppressor gene?

8. What are the 4 types of chromosomal aberrations?

9. How is the Ti plasmid used in genetic engineering?

10. List any four applications of transgenic plants.

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Give a brief note on pedigree analysis.

Or

(b) Explain autosomal dominant with suitable example.

12. (a) Give an account on supplementary gene interaction.

Or

(b) Explain the deviation of mendelism with suitable example.

13. (a) Discuss the factors involved in gene regulation.

Or

(b) Explain the mechanism of gene alteration.

14. (a) Give account on cellular oncogenes.

Or

(b) Comment on Retinoblastoma.

15. (a) Write a note on binary vectors.

Or

(b) Illustrate the any one of gene delivery method with suitable example.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Give an account of Pedigree Analysis and its significance in Family studies.

17. Discuss Epistasis and Its effects on fruit color phenotype in Cucurbita pepo.

18. Explain the recombinant DNA technology and its applications in genetic engineering.

19. Write an essay on various chromosomal abnormalities associated with malignancies.

20. Give an account of abiotic and biotic stress resistance.

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R7296	Sub. Code 502302

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Bioinformatics

STRUCTURAL BIOLOGY

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

1. What is a unit cell?
2. Write Laue's equation.
3. Brief XFEL.
4. Write Bragg's Law.
5. Write Patterson function.
6. What is Figure of merit?
7. Write about Isomorphous crystals.
8. What is free R-factor?
9. Why to calculate $2F_o - F_c$ map?
10. Explain hydrogen bond.

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Explain unit cell, Lattices, planes.

Or

(b) Bragg's law in X-ray diffraction.

12. (a) Explain synchrotron Radiation- its use in protein structure determination.

Or

(b) NMR in structure determination.

13. (a) Explain direct methods in solving the structure.

Or

(b) Explain structure validation and analysis for small molecule.

14. (a) How are data sets scaled? Write the equation for scale factor.

Or

(b) In what three ways can phases be 'improved by density modification'?

15. (a) Explain Ramachandran plot.

Or

(b) Explain X-ray crystallography in drug design.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Explain

    (a) Structure factor

    (b) Phase problem.

17. Explain Cryo-EM to solve macromolecule structure.

18. Explain Single crystal X-ray data collection, data reduction, structure solution.

19. Explain-Structural classification, folds and motifs.

20. Explain: B-factor, density fit, bulk-solvent correction.

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R7297	Sub. Code 502303

M.Sc. DEGREE EXAMINATION, NOVEMBER 2022.

Third Semester

Bioinformatics

PHARMACOGENOMICS

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** questions.

Define/ explain all of the following.

1. OMIM database
2. Lambda receptor
3. Clusters of Orthologous Groups
4. Vista
5. Pharmacodynamics
6. ADME prediction
7. Gene Expression Omnibus
8. Array Express
9. Cancer prognosis
10. ICGC

Part B (5 × 5 = 25)

Answer **all** questions, choosing either (a) or (b).

11. (a) Write briefly about SNPs database.

Or

(b) Give a short account on Lac operon prediction

12. (a) How to predict the structural changes in sequences with the influence of polymorphisms?

Or

(b) Differentiate synteny from genetic linkage.

13. (a) How to identify a lead compound?

Or

(b) Comment on Drug metabolism pathways and adverse drug reactions.

14. (a) Explain briefly about Nanopore Sequencing.

Or

(b) Comment on SAGE databases.

15. (a) Write briefly about the role of bioinformatics in cancer prognosis.

Or

(b) Comment on TCGA.

Part C

$(3 \times 10 = 30)$

Answer any **three** questions.

16. Discuss the role of bioinformatics in disease identification.

17. Describe the structural analysis based on active and binding sites.

18. Comment on the role of bioinformatic tools in Drug metabolic pathways and adverse drug reactions.

19. Write an essay on Illumina Genome Analyzer and add a note on metagenomics.

20. How to correlate clinical outcomes with genomic data?

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R7298	Sub. Code 502508

M.Sc. DEGREE EXAMINATION, NOVEMBER – 2022

Third Semester

Bio Informatics

PROGRAMMING IN C & C++

(CBCS – 2019 onwards)

Time : 3 Hours Maximum : 75 Marks

Part A (10 × 2 = 20)

Answer **all** the questions.

1. What is an expression?

2. What is the use of operators?

3. What is preprocessor?

4. Define the term function.

5. Give the syntax of union.

6. List the advantages of using structures.

7. What is polymorphism?

8. Define the term encapsulation.

9. How to find stop codon position in a given sequence using C++?

10. List any two bioinformatics applications using C++ programs.

Part B (5 × 5 = 25)

Answer **all** the questions, choosing either (a) or (b).

11. (a) Discus various operators used in 'C'.

Or

(b) Discuss essentials of C programming.

12. (a) Discuss in detail about arrays with example.

Or

(b) Explain in detail about memory allocation.

13. (a) Explain structure with examples.

Or

(b) What are the standard functions in 'C' graphics module?

14. (a) Discuss files I/O with example.

Or

(b) Explain Exception handling in C++.

15. (a) Explain, how to convert NCBI format file to fasta sequence file?

Or

(b) How to count the nucleotides of a DNA sequence using Loop? Explain it in detail.

Part C (3 × 10 = 30)

Answer any **three** questions.

16. Elaborate control statements with examples.

17. Explain in detail about pointers with example.

18. Describe in detail about file input and output operations. Give examples.

19. Discuss object oriented programming concepts in C++.

20. Elaborate any one bioinformatics application program using C++.

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