This question paper contains **2** printed pages]

GJ—26—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Pattern)

BIOINFORMATICS

Paper DSEBIT-4F

(Advanced Techniques in Bioinformatics)

(Thursday, 27-4-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) *All* questions carry equal marks.

1. Write in detail about dynamic programming method. 8

Or

(*a*) What is Genetic Algorithm ? 4

(*b*) Write a note on HMM. 4

2. Write in detail about Artificial Neural Networks with example. 8

Or

(*a*) Search algorithms. 4

(*b*) What is meant by Artificial Intelligence ? 4

P.T.O.

3. Describe in detail about Next Generation Sequencing. 8

Or

(*a*) Describe in detail about microarray and its types. 4

(*b*) Write in brief about Heuristic search methods. 4

4. Write in detail about datamining techniques. 8

Or

(*a*) Give an account on datamining in Bioinformatics. 4

(*b*) Write a note on data warehouse. 4

5. Write short notes on (any *two*) : 8

(*a*) Neural networks

(*b*) Ab-initio methods

(*c*) Machine learning

(*d*) Dynamic programming.

This question paper contains **2** printed pages]

GJ—28—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Course)

BIOINFORMATICS

Paper – DSEBIT–4F

(Biochemical and Molecular Biology Methods)

(Thursday, 27-04-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams wherever necessary.

1. Describe in detail good laboratory practices. 8

Or

(*a*) Write Bio-safety rules and regulations. 4

(*b*) Explain methods of pH analysis of solutions. 4

2. Describe in detail analysis of nucleic acids by a spectrophotometer. 8

Or

(*a*) Explain various centrifugation methods. 4

(*b*) Explain protein quantification by Lowry's method. 4

3. Describe in detail isolation, separation and analysis of protein samples by SDS-PAGE. 8

Or

(*a*) Explain isolation method of genomic DNA from plant cells. 4

(*b*) Explain the method of RNA isolation from yeast. 4

4. Describe in detail Western blotting technique and write its applications. 8

Or

(*a*) Explain Northern blotting technique. 4

(*b*) Write the theory of radioactive probe. 4

5. Write short notes on any *two* of the following : 2×4=8

(*i*) AFLP

(*ii*) Biophotometer

(*iii*) Preparation of reagents

(*iv*) Preparation of buffer solutions.

This question paper contains **2** printed pages]

GJ—29—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Course)

BIOINFORMATICS

Paper – DSEBIT–4F

(Biodiversity, Agriculture, Ecosystem and Environment)

(Thursday, 27-04-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams wherever necessary.

1. Explain monitoring and documentation of biodiversity. 8

Or

(*a*) Write a note on virtual libraries of biodiversity. 4

(*b*) Explain biodiversity application software. 4

2. Explain the strategy for growing insect resistant plants. 8

Or

(*a*) How to grow draught resistant plants in poorer soils ? 4

(*b*) Explain phosphorus cycling. 4

3. Describe in detail biosphere reserves. 8

Or

(*a*) Write a note on project tiger. 4

(*b*) Explain principles of conservation of biodiversity. 4

4. Explain alternative energy sources. 8

Or

(*a*) Write a note on biotechnological applications of microorganisms. 4

(*b*) Explain forensic analysis of Microbes. 4

5. Write short notes on any *two* : 2×4=8

(*i*) Metagenomics

(*ii*) Fuel cell

(*iii*) Carbon cycling

(*iv*) Loss of biodiversity.

This question paper contains **2** printed pages]

GJ—02—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(New Course)

BIOINFORMATICS

Paper CCBI-1F

(Concept of Genomics)

(Tuesday, 18-4-2023) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) *All* questions carry equal marks.

(*iii*) Draw well labelled diagram wherever necessary.

1. What is Genomics ? Write in detail about development in the field of gemomics. 15

Or

(*a*) Write a note on "Omics" revolution. 8

(*b*) Write in brief about C-value paradox. 7

2. Write in detail about "Human Genome project". 15

Or

(*a*) Describe in brief about Sangar's sequening method. 8

(*b*) Discuss in brief about Shotgun sequencing approach. 7

3. Describe in detail about "Next Generation Sequencing". 15

Or

(*a*) Write a note on Ion-Torrent sequencing. 8

(*b*) What is Illumina ? 7

4. Write in detail about Genome databases. 15

Or

(*a*) What are Genome browsers ? 8

(*b*) Write in brief about Genome Assembly. 7

5. Write short notes on any *three* : 3 × 5 = 15

(*a*) Biomarkar Discovery

(*b*) Human Genomics

(*c*) Structural Genomics

(*d*) Sequence Annotation

(*e*) Functional Genomics.

This question paper contains **2** printed pages]

GJ—03—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Course)

BIOINFORMATICS

(Concept of Genomics)

(Tuesday, 18-4-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) *All* questions carry equal marks.

(*iii*) Draw well labelled diagram wherever necessary.

1. Write in detail about Sanger Sequencing. 8

Or

(*a*) Describe about human Genome Project in brief. 4

(*b*) Give an account on C-value paradox. 4

2. Give an account on Ion torrent sequencing in detail. 8

Or

(*a*) Describe about shotgun sequencing in brief. 4

(*b*) Write about genome databases with examples. 4

3. Write about different research areas in genomics. 8

Or

(*a*) Write in brief about Cyanobacteria genomics. 4

(b) Write in brief about human genomics. 4

4. Give an account of applications of genomics in the field of synthetic biology and bioengineering. 8

Or

(*a*) Describe in brief about transfection. 4

(*b*) Write about biomarker discovery in brief. 4

5. Write short notes on any *two* : 8

(*a*) Virus genomics

(*b*) Comparative genomics

(*c*) NCBI genome database

(*d*) Complete genomes.

This question paper contains **2** printed pages]

GJ—10—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Course)

BIOINFORMATICS

Paper–DSEBIT-2F

(Concept of Proteomics)

(Friday, 21-04-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams wherever necessary.

1. Describe in detail basic structure of protein. 8

Or

(*a*) Explain different functions of proteins. 4

(*b*) Write applications of proteomics. 4

2. Explain in detail protein processing in endoplasmic reticulum and Golgi apparatus. 8

Or

(*a*) Write a note on role of chaperons. 4

(*b*) Write a note on proetin modifications by proteolytic cleavage. 4

3. Explain in detail principle and applications of HPLC. 8

Or

(*a*) Write a note on affinity chromatography. 4

(*b*) Write a note on size exclusion chromatography. 4

4. Explain in detail different protein structure prediction tools. 8

Or

(*a*) Write a note on protein-protein interaction. 4

(*b*) Write applications of protein array. 4

5. Write short notes on any *two* : 2×4=8

(*i*) Ion exchange chromatography

(*ii*) Protein modifications by formation of disulphide bonds

(*iii*) Protein hierarchy

(*iv*) Protein structure database (PDB).

This question paper contains **2** printed pages]

GJ—09—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(New Course)

BIOINFORMATICS

Paper–CCBI-2F

(Concept of Proteomics)

(Friday, 21-04-2023) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams if necessary.

1. Explain in detail basic structure and components of proteins. 15

Or

(*a*) Define proteome and proteomics and write different protein functions. 8

(*b*) How to determine 3D structure of proteins ? 7

2. Describe in detail protein processing in Endoplasmic Reticulum and Golgi apparatus. 15

Or

(*a*) Explain protein modifications by addition of phosphoryl, methyl, acetyl and other groups. 8

(*b*) Explain protein modifications by attachment of oligosaccharides or prosthetic groups. 7

3. Describe in detail 1D and 2D SDS PAGE techniques for protein separation. 15

Or

(*a*) Write principle and applications of ion exchange chromatography. 8

(*b*) Write principle and applications of HPLC. 7

4. Describe in detail protein structure prediction tools and servers. 15

Or

(*a*) Explain functions of protein array. 8

(*b*) Write principle and applications of MALDI-TOF. 7

5. Write short notes on any *three* : 3×5=15

(*i*) Protein-protein interaction

(*ii*) Size exclusion chromatography

(*iii*) Role of chaperons

(*iv*) Applications of proteomics

(*v*) Isoelectric focusing.

This question paper contains **2** printed pages]

GJ—24—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(New Pattern)

BIOINFORMATICS

Paper – DSEBI–4F

(Drug and Molecular Modeling)

(Thursday, 27-04-2023) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams wherever necessary.

1. Define drug and describe in detail classification of drugs. 15

Or

(*a*) Explain various roots of drug administration. 8

(*b*) Describe absorption and distribution of drugs. 7

2. Describe in detail mechanism of drug and receptor interactions. 15

Or

(*a*) Explain drug action not mediated by receptors. 8

(*b*) Describe structural based drug designing and explain how it is different from ligand based drug designing. 7

3. Describe in detail effect and mechanism of drug doses on the rate of metabolism. 15

Or

(*a*) Explain role of cytochrome P450. 8

(*b*) Explain enzyme inhibition strategies in drug metabolism. 7

4. Describe in detail principle, mode of action and target sites for HIV chemotherapeutic agents. 15

Or

(*a*) Write target sites and mode of action of therapeutic agents against cancer. 8

(*b*) Explain properties and functions of plantibodies. 7

5. Write short notes on any *three* of the following : 3×5=15

(*i*) Quantitative structure activity relationship

(*ii*) Radiation therapy for cancer

(*iii*) LD_{50} and IC_{50}

(*iv*) Drug interaction with plasma proteins

(*v*) Lipinski's rule of 5.

This question paper contains **2** printed pages]

GJ—25—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Course)

BIOINFORMATICS

Paper – DSEBIT–4F

(Drug and Molecular Modelling)

(Thursday, 27-04-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams wherever necessary.

1. Define drug and describe in detail classification of drugs. 8

Or

(*a*) Explain various roots of drug administration. 4

(*b*) Describe absorption and distribution of drugs. 4

2. Describe in detail mechanism of drug and receptor interactions. 8

Or

(*a*) Explain drug action not mediated by receptors. 4

(*b*) How structural based drug designing is different from ligand based drug designing ? 4

3. Describe in detail effect and mechanism of drug doses on the rate of metabolism. 8

Or

(*a*) Explain role of cytochrome P450 in drug metabolism. 4

(*b*) Explain enzyme inhibition strategies in drug metabolism. 4

4. Describe in detail principle, mode of action and target sites for HIV chemotherapeutic agents. 8

Or

(*a*) Write target sites and mode of action of therapeutic agents against cancer. 4

(*b*) Explain properties and functions of plantibodies. 4

5. Write short notes on any *two* of the following : 2×4=8

(*i*) Quantitative structure activity relationship

(*ii*) Radiation therapy for cancer

(*iii*) Drug interaction with plasma proteins

(*iv*) Lipinski's rule of 5.

This question paper contains **2** printed pages]

GJ—17—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Course)

BIOINFORMATICS

Paper–DSEBIT-3F

(Metabolomics)

(Tuesday, 25-04-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—2 *Hours* *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams wherever necessary.

1. Describe in detail applications of metabolomics in medical diagnosis, biomarker discovery, agriculture toxicology and nutrigenomics. 8

Or

(*a*) Define metabolomics and explain the concept of metabolome. 4

(*b*) Explain the concept of metabonomics. 4

2. Explain in detail gluconeogenesis. 8

Or

(*a*) Explain steps of pentose phosphate pathway. 4

(*b*) Describe enzymatic steps of glycogenesis. 4

3. Explain in detail principle and applications of NMR Spectroscopy. 8

Or

(*a*) Explain XCMS statistical tool. 4

(*b*) Explain MZmine statistical tool. 4

4. Describe in detail organism specific metabolic pathways. 8

Or

(*a*) Explain full genome annotation through knowledge of metabolic pathways. 4

(*b*) Describe visual comparison of metabolic pathways. 4

5. Write short notes on any *two* : 2×4=8

(*i*) Purine biosynthesis

(*ii*) Catabolism of amino acids

(*iii*) MALDI

(*iv*) Functional genomics.

This question paper contains **2** printed pages]

GJ—16—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(New Course)

BIOINFORMATICS

Paper–CCBI-3F

(Metabolomics)

(Tuesday, 25-04-2023) **Time : 10.00 a.m. to 1.00 p.m.**

Time—3 *Hours* *Maximum Marks*—75

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) Draw neat and well labelled diagrams if necessary.

1. Describe in detail applications of metabolomics in nutrigenomics, toxicity assessment, agriculture and biomarker discovery. 15

Or

(*a*) Give an overview on catabolism and anabolism. 8

(*b*) Write difference between metabolomics and metabonomics. 7

2. Describe in detail enzymatic steps for biosynthesis and biodegradation of glycogen (in-vivo). Add a note on glycogen synthase complex enzyme. 15

Or

(*a*) Explain gluconeogenesis pathway and write its significance. 8

(*b*) Explain the activity and functions of fatty acid synthase complex enzyme. 7

3. Describe in detail denovo and salvage biosynthesis of purines. 15

Or

(*a*) Write principle and applications of gas chromatography. 8

(*b*) Write principle and applications of HPLC. 7

4. Describe in detail principle and applications of mass spectrometry. Add a note on online statistical tools used to analyse MS data. 15

Or

(*a*) Explain principle and applications of NMR Spectroscopy. 8

(*b*) Explain XCMS online tool and its applications. 7

5. Write short notes on any *three* : 3×5=15

(*i*) Role of glycogenin

(*ii*) Overview of amino acid catabolism

(*iii*) Application of metabolomics in medical diagnosis

(*iv*) Organism specific metabolic pathway

(*v*) Visual comparison of metabolic pathway.

This question paper contains **2** printed pages]

GJ—23—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(New Pattern)

BIOINFORMATICS

Paper DSEBI-4F

(PHP Programming)

(Thursday, 27-4-2023) **Time : 10.00 a.m. to 1.00 p.m.**

Time—Three Hours *Maximum Marks*—75

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) *All* questions carry equal marks.

(*iii*) Write answers with examples.

1. Explain in detail decision-making statements. 15

Or

(*a*) Explain in detail numeric array with example. 8

(*b*) Explain in detail searching and replacing strings. 7

2. Explain in detail GET and Post methods with example. 15

Or

(*a*) Difference between if and if-elseif. 8

(*b*) Explain in detail capturing form data with example. 7

P.T.O.

3. Explain in detail file I/O with example. 15

Or

(*a*) Explain in detail call by value and call by reference. 8

(*b*) Write a program for multidimensional array. 7

4. Explain in detail identifying browser and platform with example. 15

Or

(*a*) Difference between GET and Post Method. 8

(*b*) Write a program for defining variable and constants. 7

5. Solve any *three* : 15

(*a*) Function

(*b*) Call by Reference

(*c*) Associative Array

(*d*) if statement

(*e*) Variable and Constants.

This question paper contains **2** printed pages]

GJ—27—2023

FACULTY OF SCIENCE

B.Sc. (Third Year) (Sixth Semester) EXAMINATION

APRIL/MAY, 2023

(Old Pattern)

BIOINFORMATICS

Paper DSEBIT-4F

(Visual Basics and PHP)

(Thursday, 27-4-2023) **Time : 10.00 a.m. to 12.00 noon**

Time—Two Hours *Maximum Marks*—40

N.B. :— (*i*) *All* questions are compulsory.

(*ii*) *All* questions carry equal marks.

(*iii*) Solve questions with examples.

(*iv*) Draw well labelled diagrams.

1. Explain in detail project types in VB fundamentals. 8

Or

(*a*) Explain in detail form layout window. 4

(*b*) Explain in detail form properties and method. 4

2. Explain in detail designing menu structure with a diagram. 8

Or

(*a*) Explain label box and its properties and methods. 4

(*b*) Explain in detail frame controls. 4

P.T.O.

3. Explain in detail capturing form data with example. 8

Or

(*a*) Write a program to create a registration form with PHP. 4

(*b*) Explain datatypes in PHP. 4

4. Explain in detail function with call by value and call by reference with example. 8

Or

(*a*) Explain in detail recursive function with an example. 4

(*b*) Explain in detail decision-making statements. 4

5. Solve any *two* : 8

(*a*) Text button

(*b*) Variables and constants

(*c*) While loop

(*d*) Call by value.