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**M.Sc. (Part – I) (Semester – II) Examination, 2015**  
**BIOINFORMATICS**  
**Paper – I : Advanced Bioinformatics**

Day and Date : Thursday, 16-4-2015  
Time : 11.00 a.m. to 2.00 p.m.

Total Marks : 70

- Instructions :** 1) *Part – I, Question 1 is compulsory.*  
2) *Attempt any four questions from Part – II.*  
3) *Figures to the right indicate full marks.*  
4) *Answers to the Part – I and Part – II are to be written in same answer Booklet only.*

PART – I

1. A) Rewrite the sentence after choosing the correct answer from the given alternatives.

7

- 1) PubMed and Medline are \_\_\_\_\_ library databases.
  - a) Visual Library
  - b) Virtual Library
  - c) Vertebral Library
  - d) All of these
- 2) \_\_\_\_\_ is a tool in EMBOSS which gives protein statistics.
  - a) Showfeat
  - b) Pepstat
  - c) Infoseq
  - d) None of these
- 3) In Dali-lite program graphical result is viewed by \_\_\_\_\_ Viewer.
  - a) Jet
  - b) Jmol
  - c) Jlib
  - d) All of these
- 4) Each amino acid corresponds to a \_\_\_\_\_ turn in an alpha helix.
  - a) 120°
  - b) 85°
  - c) 100°
  - d) None of these
- 5) N-W algorithm was published in \_\_\_\_\_.
  - a) 1981
  - b) 1970
  - c) 1980
  - d) 1987



- 6) \_\_\_\_\_ can act as a capture molecule.
- a) Proteins
  - b) Enzymes
  - c) Antibodies
  - d) All of these
- 7) In S-W algorithm the trace back begins at the \_\_\_\_\_ value found anywhere in the matrix.
- a) Minimum
  - b) Zero
  - c) Maximum
  - d) None of these
- B) Definitions : 7
- 1) Genomics
  - 2) PHD method
  - 3) Rooted tree
  - 4) Megablast
  - 5) KEGG
  - 6) Capture molecules
  - 7) Synteny.

PART – II

Answer **any four** of the following :

- 2. What is pairwise sequence alignment ? Give a detailed description of Smith-Waterman algorithm hat is pairwise sequence alignment ? 14
- 3. Explain the prediction of protein structure using PHD method. 14
- 4. Explain EMBOSS and its utilities and add a note on for what purpose EMBOSS is used ? 14
- 5. What are promoters splice sites, regulatory regions ? Explain prediction of genes using bioinformatics tools and interpretation of result. 14
- 6. Answer **any two** from the following : 14
  - a) Explain taxonomy and phylogeny and add a note on maximum parsimony.
  - b) Explain PSI-BLAST algorithm
  - c) Give a description on the secondary structural elements.
- 7. Write short notes on (**any two**) : 14
  - a) HMMer
  - b) SAGE Database
  - c) Loops and Coils.



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**M.Sc. Bioinformatics (Part – I) (Semester – II) Examination, 2015**  
**Paper No. – II : MICROBIOLOGY AND BIOTECHNOLOGY**

Day and Date : Saturday, 18-4-2015  
Time : 11.00 a.m. to 2.00 p.m.

Total Marks : 70

- Instructions :** 1) Part – I, Question 1 is **compulsory**.  
2) Attempt **any four** questions from Part – II.  
3) Figures to the **right** indicate **full** marks.  
4) Answers to the Part – I and Part – II are to be written in **same** answer booklet only.

PART – I

1. A) Rewrite the sentence after choosing the correct answer from the given alternatives. 7
- 1) \_\_\_\_\_ is used for biological method of gene transfer.  
a) bacteria      b) virus      c) both a and b      d) none
  - 2) Sanger's method of sequencing makes use of  
a) Oligonucleotide      b) Deoxynucleotide  
c) Dideoxynucleotide      d) All of these
  - 3) Prions are basically  
a) RNA      b) Proteins      c) DNA      d) Virus
  - 4) The locomotory structures of bacteria are  
a) Cilia      b) Flagella      c) Both a and b      d) None
  - 5) The standard tissue culture medium stands with the name of  
a) Haberlandt and Skoog      b) Murashige and Skoog  
c) Cocking and Skoog      d) Miller and Skoog
  - 6) \_\_\_\_\_ is used for biological method of gene transfer.  
a) bacteria      b) virus      c) both a and b      d) none
  - 7) In \_\_\_\_\_ process the genetic material is transferred from donor to recipient cell through conjugation tube.  
a) Transduction      b) Conjugation  
c) Transformation      d) None of these



- B. Definitions : 7
- 1) Probe
  - 2) HindIII
  - 3) Primers
  - 4) YACs
  - 5) Histone proteins
  - 6) Sex pilli
  - 7) Viroids.

### PART – II

Answer **any four** of the following.

2. Explain general characteristics and classification of plant viruses. 14
  3. Explain the structure and replication of bacteriophage lambda. 14
  4. Describe the structure and function of cloning vectors-pUC 18 and pBR322. 14
  5. Explain the different methods of gene transfer in plant and animal systems. 14
  6. Answer **any two** from the following. 14
    - a) Explain the organization of viral genome.
    - b) Applications of recombinant DNA Technology.
    - c) Write a note on somatic and germline gene therapy.
  7. Write short notes on (**any two**). 14
    - a) Transformation
    - b) Bacterial growth kinetics
    - c) Cosmids.
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**M.Sc. (Part – I) (Semester – II) Examination, 2015**  
**BIOINFORMATICS**  
**Paper – III : Basic Biochemistry and Immunology**

Day and Date : Tuesday, 21-4-2015  
Time : 11.00 a.m. to 2.00 p.m.

Total Marks : 70

- Instructions:** 1) Part – I, Question 1 is **compulsory**.  
2) Attempt **any four** questions from Part – II.  
3) Figures to the **right** indicate **full** marks.  
4) Answers to the Part – I and Part – II are to be written in **same answer booklet only**.

PART – I

1. A) Rewrite the sentence after choosing the correct answer from the given alternatives :

7

- 1) Standard free energy is denoted by \_\_\_\_\_  
A)  $\Delta E^\circ$                       B)  $\Delta G^\circ$                       C)  $\Delta H^\circ$                       D)  $\Delta F^\circ$
- 2) \_\_\_\_\_ is the main source of free energy in biological system.  
A) Glucose                                      B) Fatty acids  
C) ATP    D) All
- 3) Amino acids possessing both the charges are called \_\_\_\_\_  
A) Divalent ions                                      B) Zwitter ions  
C) Dipole ions                                      D) None
- 4) \_\_\_\_\_ is a structural polysaccharide.  
A) Starch    B) Cellulose  
C) Glycogen    D) Sucrose
- 5) \_\_\_\_\_ is an example of agranulocyte.  
A) B cell    B) Basophil  
C) Neutrophil    D) Eosinophil



- 6) \_\_\_\_\_ is a secondary lymphoid organ.
- A) Bursa of Fabricius                      B) Lymph node  
C) Thymus                                      D) None
- 7) Antibodies are produced by differentiated \_\_\_\_\_
- A) B cells                      B) T cells                      C) NK cells                      D) None

## B) Definitions :

7

- 1) Free energy
- 2) Glycosidic bond
- 3) Enzyme
- 4) Phagocyte
- 5) IgM
- 6) Cytokine
- 7) CMI.

## PART – II

Answer **any four** of the following :

2. Explain the structural classification of proteins. **14**
3. Define carbohydrate. Add a note on their classification. **14**
4. Write a detailed note on innate immunity. **14**
5. Explain different types of antigen-antibody interactions. **14**
6. Answer **any two** from the following : **14**
  - a) Write a note on ATP as energy source.
  - b) Add a note on factors affecting enzyme activity.
  - c) Explain the humoral mediated immunity.
7. Write short notes on (**any two**) : **14**
  - a) Protein folding
  - b) Macrophages
  - c) Disorders of immune system.

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- 6) PERL stands for \_\_\_\_\_
- Practical Extraction Report Language
  - Preparation Extraction Report Language
  - Practical Extraction Review Language
  - None of these
- 7) The applet class is in \_\_\_\_\_ package.
- java.util
  - java.io
  - .java.lang
  - java.applet

## B) Definitions :

7

- Constants
- Split function
- JVM
- Perl
- Scalar
- Perl Hash
- Applet.

## PART – II

Answer **any four** of the following :

- Explain hash variables and functions and write a Perl script using to display three letter and one letter amino acid code. **14**
- Explain array in Perl with its example. **14**
- Explain applet and applet life cycle of with example. **14**
- Explain array and hash variable in Perl with example. **14**
- Answer **any two** from the following : **14**
  - Explain constants in java with example.
  - Design a registration page using applet.
  - Explain interface in java.
- Write short notes on (**any two**) : **14**
  - Java features
  - Perl in bioinformatics
  - Exception handling in java.

\_\_\_\_\_





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**M.Sc. (Bioinformatics) (Part – II) (Semester – IV) Examination, 2015  
Paper – I : BIOLOGICAL SIMULATION AND MODELING (New)  
(CGPA Pattern)**

Day and Date : Thursday, 16-4-2015

Total Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions :** 1) *Part – I, Question 1 is compulsory.*  
2) *Attempt any four questions from Part – II.*  
3) *Figures to the right indicate full marks.*  
4) *Answers to the Part – I and Part – II are to be written in same answer booklet only.*

PART – I

1. A) Rewrite the sentence after choosing the correct answer from the given alternatives :

7

- 1) Python is \_\_\_\_\_ types of language.  
a) dynamic                      b) semi-dynamic      c) static                      d) none of these
- 2) The \_\_\_\_\_ function creates a Python file object.  
a) fopen()                      b) open()                      c) fileopen()                      d) none of these
- 3)  $x = 4.5$   $y = 2$  print  $x/y$  ? What will be the output ?  
a) 2.0                      b) 10.0                      c) 5.0                      d) 1.0
- 4) The first step in simulation is  
a) calculation                      b) processing                      c) model building      d) all
- 5) \_\_\_\_\_ is a base of any simulation.  
a) Statistics                      b) Mathematics                      c) Physics                      d) Chemistry
- 6) MD in simulation stands for  
a) Microbial Dynamics                      b) Macroscopic Dynamics  
c) Molecular Dynamics                      d) None
- 7) The first protein simulated was  
a) Insulin                      b) Trypsin inhibitor  
c) Polymerase                      d) Protease

P.T.O.



B) Definitions :

7

- 1) Python
- 2) Dynamic
- 3) Static
- 4) Class
- 5) System
- 6) SIR
- 7) Energy.

## PART – II

Answer **any four** of the following :

2. Explain string functions in python with example. **14**
  3. Explain working with files in python. **14**
  4. Write a note on principles and applications of simulations. **14**
  5. Explain population model in simulation with examples. **14**
  6. Answer **any two** from the following : **14**
    - 1) Write a note on simulation software.
    - 2) Explain python editor in details.
    - 3) Add a note on Molecular mechanics.
  7. Write short notes on (**any two**) : **14**
    - a) Biological simulation.
    - b) Functions in python.
    - c) Examples of molecular dynamics.
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SLR-RP – 61

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**M.Sc. (Part – II) Semester – IV (CGPA) Pattern Examination, 2015  
BIOINFORMATICS (New)  
Paper No. II – Biodiversity Informatics and IPR**

Day and Date : Saturday, 18-4-2015

Total Marks : 70

Time : 3.00 p.m. to 6.00 p.m.

- Instructions:** 1) Part – I, Question 1 is **compulsory**.  
2) Attempt **any four** questions from Part – II.  
3) Figures to the **right** indicate **full** marks.  
4) Answer to the Part – I and Part – II are to be written in **same** answer Booklet **only**.

PART – I

1. A) Rewrite the sentence after choosing the correct answer from the given alternatives. 7
- 1) Floras, Plants and Peoples, and Landscape Ecology are the programmes of  
a) BGBM                      b) BRIT                      c) GBIF                      d) None of these
- 2) A character can be \_\_\_\_\_ when nucleotide changes are shared by two or more taxa.  
a) phylogenetically informative                      b) phylogenetically uninformative  
c) both a and b                      d) none of these
- 3) \_\_\_\_\_ investigates plants and the environment.  
a) Landscape Ecology                      b) Plants and Peoples  
c) Floras                      d) All of these
- 4) The extent of \_\_\_\_\_ can be measured by the number of links in the food web.  
a) Landscape diversity                      b) Community diversity  
c) Genetic diversity                      d) All of these
- 5) Which of the following is not a type of copyright work ?  
a) Literary works                      b) Furniture  
c) Sculpture                      d) Musical works

P.T.O.



- 6) World intellectual property organization was created in \_\_\_\_\_ year.  
 a) 1967                      b) 1960                      c) 1957                      d) 1980
- 7) \_\_\_\_\_ of the following is not specifically protected by intellectual property legislation.  
 a) Trade marks    b) Patents                      c) Copyright                      d) Trade secrets

B) Answer the following.

7

- 1) Taxonomy
- 2) Patch density
- 3) Biodiversity informatics
- 4) GBIF
- 5) Industrial design
- 6) Farmer's right
- 7) WIPO.

## PART – II

Answer **any four** of the following.

2. Explain in brief principles of Taxonomy and add a note on phylogeny in Biodiversity Informatics. 14
  3. Explain goals of WIPO. Add a note on Protection of Intellectual property. 14
  4. What is Biodiversity Informatics ? Explain in detail national, regional and global biodiversity information systems and network. 14
  5. Explain patenting of biological material with case study. 14
  6. Answer **any two** of the following. 14
    - 1) Explain Conservation of Biodiversity.
    - 2) Write a note on advantages and disadvantages of PBR.
    - 3) Explain technology transfer.
  7. Short notes (**any two**). 14
    - 1) Types of phylogenetic tree.
    - 2) Trade mark.
    - 3) Biodiversity data availability.
-



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**M.Sc. (Bioinformatics) (Part – II) (Semester – IV) (CGPA Pattern)  
Examination, 2015  
Paper – III : ADVANCED MOLECULAR BIOLOGY (New)**

Day and Date : Tuesday, 21-4-2015  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions:** 1) Part – I, Question 1 is **compulsory**.  
2) Attempt **any four** questions from Part – II.  
3) Figures to the **right** indicate **full** marks.  
4) Answers to the Part – I and Part – II are to be written in **same** answer booklet only.

PART – I

1. A) Rewrite the sentence after choosing the correct answer from the given alternatives :
- 1) PCR is used in \_\_\_\_\_  
a) RAPD                      b) AFLP                      c) RFLP                      d) Both a) and b)
- 2) cDNA is prepared from \_\_\_\_\_  
a) rRNA                      b) mRNA                      c) tRNA                      d) snRNA
- 3) Western Blotting is used for \_\_\_\_\_  
a) DNA                      b) Protein                      c) RNA                      d) Both a) and b)
- 4) Dialysis is used to remove \_\_\_\_\_  
a) Salt                      b) Protein                      c) Both a) and b)                      d) None
- 5) Edman degradation is used for \_\_\_\_\_  
a) DNA sequencing                      b) Protein sequencing  
c) RNA sequencing                      d) All
- 6) DNA fingerprint is used to detect \_\_\_\_\_  
a) Paternity                      b) Crime samples  
c) Genetic test                      d) All
- 7) \_\_\_\_\_ chromatography is used to separate proteins based on size and shape.  
a) HPLC                      b) Ion exchange  
c) Affinity                      d) Gel filtration

7



B) Answer the following :

7

- 1) Autoradiography
- 2) Taq DNA polymerase
- 3) Biochip
- 4) ddNTPs
- 5) Cy3 and Cy5
- 6) Nitrocellulose membrane
- 7) Electro Blot.

### PART – II

Answer **any four** of the following :

2. What is amplicon ? Explain different types of PCR techniques. **14**
  3. Explain in detail the protein sequencing method. **14**
  4. Explain in detail southern blot and western blot techniques and its applications. **14**
  5. What is electrophoresis ? Describe the separation of proteins using SDS PAGE. **14**
  6. Answer **any two** of the following : **14**
    - 1) Write a note on Plaque hybridization technique.
    - 2) Give a detailed account on DNA finger printing.
    - 3) Give a detailed account on DNA microarray.
  7. Short notes (**any two**) : **14**
    - 1) Iso Electric Focusing
    - 2) RT-PCR
    - 3) cDNA library.
-



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**M.Sc. (Part – II) (Semester – IV) Examination, 2015**  
**BIOINFORMATICS**  
**New (CGPA Pattern)**  
**Paper No. IV : Emerging Areas of Bioinformatics**

Day and Date : Thursday, 23-4-2015  
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 70

- Instructions:** 1) *Part – I, Question 1 is compulsory.*  
2) *Attempt any four questions from Part – II.*  
3) *Figures to the right indicate full marks.*  
4) *Answers to the Part – I and Part – II are to be written in same answer booklet only.*

PART – I

1. A) Rewrite the sentences after choosing the correct answer from the given alternatives. 7
- 1) \_\_\_\_\_ is a file format for holding information about the atoms, bonds, connectivity and co-ordinates of a molecule.  
a) SDF                      b) MDL Mol      c) SMILES              d) WLN
  - 2) BeeBase is an online bioinformatics database that displays data related to  
a) *Apis florea*                                      b) *Apis dorsata*  
c) *Apis mellifera*                                d) None of these
  - 3) PCA refers to  
a) Particle Component Analysis      b) Particle Catalytic Activity  
c) Principal Component Analysis    d) None of these
  - 4) \_\_\_\_\_ is a pathogen database.  
a) VIPR                      b) EuPathDB      c) GOLD                      d) Both a and b
  - 5) \_\_\_\_\_ is a file format used to represent chemical structure records and its associated data fields.  
a) CML                      b) SDF                      c) XYZ                      d) All of these



- 6) \_\_\_\_\_ represents molecules by list of the atoms and of the bonds in the molecule.
- |                       |                     |
|-----------------------|---------------------|
| a) Atom look-up table | b) Connection table |
| c) Both a) and b)     | d) None of these    |
- 7) \_\_\_\_\_ first used the term nanotechnology.
- |                 |                    |
|-----------------|--------------------|
| a) Eric Drexler | b) Richard Feynman |
| c) Sumio Iijima | d) None of these   |

## B) Definitions :

7

- 1) WLN
- 2) Vaccine designing
- 3) Molecular modeling
- 4) Silver nanoparticle
- 5) EuPathDB
- 6) Top down
- 7) Gene Map.

## PART – II

Answer **any four** of the following :

2. Define Immuno-informatics and explain the future of computational modeling and prediction system in clinical immunology. **14**
3. Enlist the different databases for chemical structure representation and add a note on QSAR.S. **14**
4. Give a detailed account on various genome databases. **14**
5. Explain synthesis of nanoparticles by mechanical and biological method. **14**
6. Answer **any two** of the following : **14**
  - 1) SMILE representation.
  - 2) Give a detailed account on applications of nanoparticles in different area of science.
  - 3) Give a detailed account on analysis of silver nanoparticles by UV and FTIR.
7. Short notes (**any two**) : **14**
  - 1) Types of chemical databases and its uses
  - 2) Applications of genome sequencing
  - 3) FTIR.