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M.Sc. (Part – I) (Semester – II) Examination, 2014
BIOINFORMATICS
Paper – I : (CGPA Pattern) Advanced Bioinformatics (New)

**Day and Date :Tuesday, 22-4-2014
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



- 6) The PAM matrices were introduced by _____
 a) Margaret Dayhoff b) Feng and Doolittle
 c) Henikoff and Henikoff d) None of these
- 7) Each amino acid corresponds to a _____ turn in an alpha helix.
 a) 120° b) 100° c) 85° d) None of these

B) Definitions :

- 1) Synteny
- 2) Phylip
- 3) BankIt
- 4) Taxonomy
- 5) HMM
- 6) SAM
- 7) Comparative genomics.

7

PART – II

Answer **any four** of the following :

2. Explain in detail sequence pattern and profile analysis and add a note on Gribskov method. 14
3. What are scoring matrices and give a detailed derivation of PAM and BLOSSUM matrices ? 14
4. Describe in detail identification of secondary structure elements from the knowledge structure. 14
5. Explain protein arrays, its basic principles and applications. 14
6. Answer **any two** from the following : 14
- a) Identification of SNPs from SNP database.
 - b) Explain the Mega blast algorithm and add a note of BLAST2.
 - c) Use of HMM based algorithm for MSA.
7. Write short notes on (**any two**) : 14
- a) MEGA
 - b) EXPASY
 - c) MUMmer.
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M.Sc. (Part – I) (Semester – II) Examination, 2014
(CGPA Pattern)
BIOINFORMATICS
Paper – II : Microbiology and Biotechnology (New)

**Day and Date : Thursday, 24-4-2014
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



PART - II

Answer any four of the following :

2. What is 'Domain of life' and give a detailed account on the General characteristics of Archaea and Eubacteria. **14**

3. Explain General structure of prokaryotic cell with neat labeled diagram. **14**

4. Write a note on different types of cloning vectors. **14**

5. Describe the physical methods of gene transfer. **14**

6. Answer **any two** from the following : **14**

 - Describe the genetic recombination in bacteria with reference to conjugation process in bacteria.
 - Add a note on application of r-DNA technology in crop improvement.
 - Discuss the historical aspects of tissue culture.

7. Write short notes on **(any two)** : **14**

 - Mycoplasma
 - Bacterial classification
 - Biostatic Gun.



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M.Sc. (Part – I) (Semester – II) Examination, 2014
BIOINFORMATICS

Paper – III : Basic Biochemistry and Immunology (New) (CGPA Pattern)

Day and Date : Saturday, 26-4-2014

Total Marks : 70

Time : 11.00 a.m. to 2.00 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) The major source of energy for a living cell is
 - A) Carbon
 - B) Nitrogen
 - C) Oxygen
 - D) Hydrogen
- 2) Enzymes belong to the class of _____ proteins.
 - A) Regulatory
 - B) Signal
 - C) Structural
 - D) All
- 3) The basic components of lipids are
 - A) amino acids
 - B) vitamins
 - C) fatty acids
 - D) glucose
- 4) Agarose is an example of
 - A) Polysaccharide
 - B) Monosaccharide
 - C) Oligosaccharide
 - D) None
- 5) B cells are derived from _____ lineage.
 - A) Erythroid
 - B) Myeloid
 - C) Osteoid
 - D) Leucoid



PART - II

Answer any four of the following :

- | | |
|--|----|
| 2. Explain different types of amino acids. | 14 |
| 3. Add a note on classification of carbohydrates. | 14 |
| 4. Write a detailed note on adaptive immunity. | 14 |
| 5. Define Antibody. Explain its structure with a neat diagram. | 14 |
| 6. Answer any two from the following : | 14 |
| a) Write a note on functions of lipids. | |
| b) Add a note on enzyme classification. | |
| c) Explain the cell mediated immunity. | |
| 7. Write short notes on (any two) : | 14 |
| a) α Helix | |
| b) Complement system | |
| c) Immunodeficiency. | |



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M.Sc. (Part – I) (Semester – II) Examination, 2014
BIOINFORMATICS (New)
Paper – IV : Programming in Object Oriented Languages
(CGPA Pattern)

Day and Date : Tuesday, 29-4-2014
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) The highest priority of a method can be
 - a) 10
 - b) 100
 - c) 5
 - d) 1
- 2) The exception class is in _____ package.
 - a) java.file
 - b) java.io
 - c) java.lang
 - d) java.util
- 3) Which keyword is used to monitor statement for exception ?
 - a) try
 - b) catch
 - c) throws
 - d) none of these
- 4) The priority of a thread can be got by _____ method.
 - a) prority()
 - b) getPriority()
 - c) setPriority()
 - d) threadPriority()
- 5) A package is a collection of
 - a) Classes
 - b) Interfaces
 - c) Editing tools
 - d) None of these



- 6) my \$val= 'x';
print \$val;

 - a) scalar
 - b) empty value
 - c) string
 - d) none of these

7) Perl stands for

 - a) Practical extraction report language
 - b) Preparation extraction report language
 - c) Practical extraction review language
 - d) None of these

B) Definitions.

7

- | | |
|-----------------------|--------------|
| 1) Garbage collection | 2) Applet |
| 3) Bytecode | 4) Scalar |
| 5) Java | 6) Perl Hash |
| 7) Class. | |

PART - II

Answer any four of the following.

- | | |
|--|----|
| 2. What is applet in java and explain life cycle of applet with example. | 14 |
| 3. Explain Hash variable in Perl with its functions. | 14 |
| 4. Explain features of java in details. | 14 |
| 5. Explain array and list data in Perl with example. | 14 |
| 6. Answer any two from the following : | 14 |
| a) Design a simple login page using applet in java. | |
| b) Write a Perl script to display three letter and one letter amino acid code. | |
| c) Explain exception handling in java. | |
| 7. Write short notes on (any two) : | 14 |
| a) Thread methods | |
| b) Java datatype | |
| c) Perl in bioinformatics. | |



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M.Sc. (Part – II) (Semester – IV) Examination, 2014
BIOINFORMATICS
Paper – I : Simulation and Modelling for Biologists and
Soft Computing

Day and Date : Tuesday, 22-4-2014

Total Marks : 100

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 :

10

- 1) Simulation is applied to _____ field.
a) Physics b) Chemistry c) Biology d) All
- 2) Simulation is the study of behavior of system at a given _____
a) Time b) Pressure c) Temperature d) All
- 3) _____ is subjected to simulation.
a) System b) Unit c) Cell d) None
- 4) The general principle of simulations have _____ number of classes.
a) 1 b) 2 c) 3 d) 4
- 5) _____ is the last action in simulation.
a) Listing of events b) Counting of events
c) Executing the events serially d) Setting the clock zero
- 6) During handling of variability, _____ are of great importance.
a) Common numbers b) Pseudo random numbers
c) Random numbers d) All



- 7) _____ is an example of the biological model.
- Growth model
 - Variable model
 - Queuing model
 - None
- 8) Simulated annealing is associated with _____ dynamics.
- Temperature
 - Pressure
 - Energy
 - All
- 9) _____ is an example of simulation software.
- SOAP
 - REST
 - Genostar
 - All
- 10) Genetic algorithms finds their application in _____
- AI
 - MC
 - MD
 - ARM
- B) Answer the following : 10
- Molecular mechanics
 - Event
 - Deterministic model
 - Pseudo random number
 - Artificial intelligence.

PART – II

Answer **any four** of the following :

2. Define simulation. Add a note on general principles and applications of simulation in various fields. 20
3. What are queuing models ? Give a detailed explanation on Monte-Carlo simulation method. 20
4. Add a detailed note on epidemic model of biological simulation. 20
5. Write short answers of **any two** from the following : 20
- Genetic algorithms
 - Comment on bacterial growth model
 - Explain energy and different forms of energy.
6. Write short notes on **any four** of the following : 20
- Simulated annealing
 - Genostar
 - Models for biochemical reaction kinetics
 - Population model
 - Back propagation
 - Molecular dynamics.
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M.Sc. (Part – II) (Semester – IV) Examination, 2014
BIOINFORMATICS (Paper – II)
Biodiversity Informatics and IPR

Day and Date : Thursday, 24-4-2014

Total Marks : 100

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. 10

1) _____ investigates plants and the environment.

a) Floras b) Landscape ecology
c) Plants and peoples d) All of these

2) _____ is the process by which new blood vessels are formed from existing vessels.

a) Pre-eclampsia b) Angiogenesis
c) Penetrance d) Telangiectasia

3) An area is designated as a ‘hotspot’ when it contains at least _____ of plant species as endemic.

a) 0.8% b) 0.25% c) 0.5% d) 0.2%

4) In DNA-DNA hybridization study, sequence divergence is proportional to _____

a) Melting temperature b) Mutation
c) Both a) and b) d) None of these



- 5) IUCN publishes _____ of organisms.
- a) Genetic names b) Generic names
c) Gene class d) None of these
- 6) Coca-cola is a well known example of _____
- a) trade secret b) trade mark
c) patent d) copyright
- 7) WIPO stands for
- a) Wide Intellectual Provisional Office
b) World Intelligence Protection Organization
c) World Internal Property Organization
d) World Intellectual Property Organization
- 8) The farmers act was formulated in the year _____
- a) 1951 b) 1999
c) 2001 d) 2005
- 9) _____ can be protected for unlimited period of time.
- a) Trade secret b) Patents
c) Trade mark d) None of the above
- 10) Hibbred patent is associated with _____ patent.
- a) Micro-organism b) Animal
c) Plant d) Molecule
- B) Answer the following : **10**
- 1) Product patent
 - 2) Phylogeny
 - 3) TRIPS
 - 4) BGBM
 - 5) Patent ethics.



PART – II

Answer **any four** of the following :

- | | |
|---|-----------|
| 2. Write an essay on ‘Biological patents’. | 20 |
| 3. Give a detail account on molecular systematics. | 20 |
| 4. Explain in brief principles of taxonomy. Write a separate note on phylogeny in biodiversity informatics. | 20 |
| 5. Write short answers of any two from the following : | 20 |
| 1) GBIF | |
| 2) Patent procedure | |
| 3) Copyrights. | |
| 6. Write short notes on any four of the following : | 20 |
| 1) Diamond Vs Chakraborty case | |
| 2) Geographical indications | |
| 3) Gene patent | |
| 4) Types of phylogenetic trees | |
| 5) Biodiversity data availability | |
| 6) Biodiversity informatics projects of the world. | |
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M.Sc. (Part – II) (Semester – IV) Examination, 2014
BIOINFORMATICS
Advanced Molecular Biology (Paper – III)

Day and Date : Saturday, 26-4-2014

Total Marks : 100

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 book only.*

PART – I

1. A) Choose the correct answer from given alternatives : 10

- I) The thermostable form of DNA polymerase used in PCR cycles is _____
- a) Paq b) Baq c) Taq d) Maq
- II) _____ blotting technique involves transfer of RNA molecules onto membranes for the detection of specific sequences by hybridization.
- a) Northern blotting b) Southern blotting
- c) Western blotting d) South Western blotting
- III) Relative expression levels of thousands of genes can be visualized using _____ technology.
- a) Autoradiography b) DNA fingerprinting
- c) RFLP d) Microarray
- IV) _____ technology uses radioactive probes to identify bands derived from hyper variable regions of DNA.
- a) DNA finger printing b) DNA foot printing
- c) Colony hybridization d) In-situ hybridization
- V) One of the application of site-directed mutagenesis is _____
- a) Microarray b) Microinjection
- c) Protein engineering d) Gel matching



- VI) _____ method is used as a chemical method for protein sequencing.
- a) Immunohistochemical
 - b) Edman degradation
 - c) Di-deoxysangers
 - d) Maxam and Gilbert
- VII) Two-dimensional polyacrylamide gel electrophoresis (2-D -PAGE) is a method used to separate proteins according to _____
- a) Centrifugal force
 - b) Mass
 - c) Charge
 - d) Charge and mass
- VIII) The most commonly used general protein stain for detecting proteins on gels is _____
- a) Ethidium Bromide
 - b) Methylene Blue
 - c) Coomassie Brilliant Blue
 - d) Alcian Blue
- IX) _____ chromatography method is used to separate a protein that binds strongly to its substrate.
- a) Gel filtration
 - b) Cation exchange
 - c) Anion exchange
 - d) Affinity
- X) A commonly employed first separation step in protein isolation is _____
- a) Ammonium sulfate precipitation
 - b) Gel filtration chromatography
 - c) Ion-exchange chromatography
 - d) Electrophoresis
- B) Answer the following : 10
- a) Taq polymerase
 - b) Probes
 - c) Expsy
 - d) Ampholytes
 - e) Dialysis.



PART – II

Answer any four of the following :

2. Discuss the principles, methodology and applications of PCR. **20**
3. Discuss the isolation and purification of proteins using chromatographic methods. **20**
4. What are probes ? Elaborate principle, methodology and applications of Southern blotting. **20**
5. Write short answer (**any two**) :
a) Compare SDS-PAGE and Native-PAGE.
b) Colony hybridization and its application ins screening of recombinants
c) Write note on DNA fingerprinting.
6. Write short notes on (**any four**) :
a) Site directed mutagenesis
b) RFLP
c) 2-D PAGE
d) HPLC
e) Autoradiography
f) Edman degradation.
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M.Sc. (Part – II) (Semester – IV) Examination, 2014
BIOINFORMATICS (Paper – IV)
Emerging Areas of Bioinformatics

Day and Date : Tuesday, 29-4-2014
Time : 3.00 p.m. to 6.00 p.m.

Total Marks : 100

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

PART – I

1. A) Choose the correct answer from the alternative and rewrite the sentence : **10**

- 1) SMILES refer to
 - a) System Mutation Immune Lineage Entry Specification
 - b) Simplified Molecular Input Line Entry Specification
 - c) Simple Mutation Invivo Line Entry Specification
 - d) System Mutation Immune Line Entry Specification
- 2) _____ protocols include WMS and WFS.
 - a) Open Geographic consortium
 - b) Open Geospatial Consortium
 - c) Both a and b
 - d) Office of Groove City
- 3) Chloramphenicol is an example of
 - a) Soft drug
 - b) Hard drug
 - c) Prodrug
 - d) Shot drug
- 4) ADME includes all except
 - a) absorption
 - b) distribution
 - c) metabolism
 - d) circulation
- 5) _____ coined the term nanotechnology.
 - a) Harper
 - b) Bob Holmes
 - c) Richard Feynman
 - d) Willknight



- 6) QSAR stands for
- Qualitative Structure Activity Relation
 - Quantum Structure Active Relation
 - Quantitative Structure Activity Relationship
 - Quality Size Active Relation
- 7) HLA/IMGT database is present in
- | | | | |
|---------|---------|---------|---------|
| a) NCBI | b) EMBL | c) DNAS | d) DDBJ |
|---------|---------|---------|---------|
- 8) Methods and tools used in cheminformatics include
- | | | | |
|------------|---------|--------|-----------------|
| a) Genbank | b) QSAR | c) CML | d) Both b and c |
|------------|---------|--------|-----------------|
- 9) Cytochrome p450 is involved in
- | | |
|--------------------|----------------|
| a) Drug metabolism | b) Respiration |
| c) Digestion | d) Circulation |
- 10) _____ is the immenomic database.
- | | |
|---------|---------------------|
| a) IMGT | b) IPD |
| c) IRIS | d) All of the above |
- B) Answer the following : 10
- Peptide repertoire
 - GOLD database
 - Nano filters
 - LIDAR
 - High throughout sequencing

PART – II

Answer **any four** of the following :

- | | |
|---|-----------|
| 2. Give a detailed explanation on future of computational modeling and prediction systems in clinical immunology. | 20 |
| 3. What is chemoinformatics ? Explain the use of chemoinformatics. | 20 |
| 4. Discuss the various genome sequencing projects and their implications. | 20 |



5. Write short answers of **any two** from the following : **20**

- a) Drug Bank
- b) GIS
- c) Nanoparticles

6. Write short notes on **any four** from the following : **20**

- a) Immunome databases
 - b) Bee Base
 - c) Peptide repertoire
 - d) Pharmacogenomics
 - e) Personalized medicine
 - f) Bioinformatics
-

