

Seat
No.

Set P

M.Sc. (Semester - I) (CBCS) Examination Nov/Dec-2018
Bioinformatics
BASIC BIOINFORMATICS

Time: 2½ Hours

Max. Marks: 70

Instructions: All questions are compulsory.**Q.1 Multiple choice Questions:-****14**

- 1) _____ database is a Microarray gene expression database studying in bioinformatics.
 - a) GEO
 - b) MMDB
 - c) DDBJ
 - d) EMBL
- 2) _____ is a graphical control element that presents a hierarchical view of information of phylogentic analysis.
 - a) Diagonal view
 - b) Alignment view
 - c) Tree view
 - d) Domain view
- 3) The delta rule is often utilized by the most common class of ANNs called _____ neural networks.
 - a) classification
 - b) backpropagational
 - c) unidirectional
 - d) feed forward
- 4) Clustal w is a _____ multiple alignment program available either as a stand-alone or on-line program.
 - a) exhaustive
 - b) block based
 - c) progressive
 - d) iterative
- 5) _____ is branch of which study the organismal variation in phenotype as it changes during its life span.
 - a) Phenomics
 - b) Metabolomics
 - c) Transcriptomics
 - d) Genomics
- 6) _____ database only contains sequence families not covered in Pfam-A.
 - a) Prosite
 - b) PIR
 - c) pfam b
 - d) Blocks
- 7) _____ Markov model describes the probability of the current state being determined by the previous state.
 - a) First-order
 - b) Second-order
 - c) Third-order
 - d) Zero-order
- 8) _____ is molecular biology database and text data along with sequence data retrieval system developed by NCBI.
 - a) Dbget
 - b) dblink
 - c) Entrez
 - d) Srs
- 9) _____ is a database that uses multiple alignments derived from the most conserved, ungapped regions of homologous protein sequences.
 - a) Emotif
 - b) Blocks
 - c) Smart
 - d) Cath
- 10) In a protein sequence alignment, _____ refers to the percentage of matches of the same amino acid residues between two aligned sequences.
 - a) sequence identity
 - b) sequence homology
 - c) sequence similarity
 - d) sequence non homology

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M.Sc. (Semester - I) (CBCS) Examination Nov/Dec-2018
Bioinformatics
CELL BIOLOGY AND GENETICS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) All questions are compulsory.
 2) Draw neat and labeled diagrams wherever necessary.
 3) Figures to the right indicate full marks.

Q.1 Rewrite the following sentences by using correct alternative **14**

- 1) _____ is a cell organelle known as suicide bags of the cell?
 - a) Ribosome
 - b) Lysosome
 - c) Peroxisome
 - d) Mitochondria
- 2) _____ is known as programmed cell death.
 - a) Apoptosis
 - b) Endocytosis
 - c) Necrosis
 - d) Metastasis
- 3) _____ is responsible for replication of nuclear DNA in eukaryotes.
 - a) DNA polymerase θ
 - b) DNA polymerase III
 - c) DNA polymerase γ
 - d) DNA polymerase δ
- 4) In eukaryotic translation process _____ acts as initiator tRNA molecule.
 - a) tRNA^{met}
 - b) tRNA^{fmet}
 - c) tRNA^{val}
 - d) tRNA^{leu}
- 5) In mRNA processing 7-methylguanosine cap is added at the _____ end of the transcript.
 - a) 3' and 5' end
 - b) 3' end
 - c) 2' end
 - d) 5' end
- 6) During eukaryotic DNA replication process _____ binds directly to autonomously replicating sequences.
 - a) DNA polymerase θ
 - b) DNA polymerase III
 - c) DNA polymerase γ
 - d) Origin recognition complex
- 7) Non-coding DNA sequences present in the eukaryotic genes is also known as _____.
 - a) Introns
 - b) Exons
 - c) Coding region
 - d) Euchromatin
- 8) _____ are also known as communicating junctions.
 - a) Desmosomes
 - b) Hemi-Desmosomes
 - c) Gap junctions
 - d) Tight Junctions.
- 9) _____ is act as secondary messenger molecule during signal transduction.
 - a) Neurotransmitter
 - b) Enzyme
 - c) cAMP
 - d) Hormones
- 10) Cdk stands for _____.
 - a) Cycline dependent kinases
 - b) Caspase dependent kinases
 - c) Cytochrome depenent kinases
 - d) Cycline degrading kinases

- 11) _____ is responsible for acidification of stomach.
a) Facilitated diffusion b) Passive transport
c) Proton pump d) Simple diffusion
- 12) _____ enzyme is responsible for protein folding.
a) Photolyase b) Photo-reductase
c) Photo-resolvase d) Protein disulfide isomerase
- 13) In operon, _____ responsible for synthesis of inhibitory protein.
a) Promoter b) Enhancer
c) Regulatory gene d) Operator
- 14) In BER, _____ responsible for initial recognition of the lesion.
a) AP endonucleases b) DNA epinucleases
c) DNA Glycosylases d) DNA exonucleases

Q.2. A) Answer any four of the following. 08

- 1) Enlist functions of RER.
- 2) Define Cyclins.
- 3) What are exons and introns?
- 4) Define operon.
- 5) What is RNA editing?
- 6) Distinguish between prokaryotic and eukaryotic cell.

B) Answer the following questions (Any Two) 06

- 1) What are gap junctions?
- 2) Write note on NPCs.
- 3) What is facilitated diffusion?

Q.3. A) Answer the following. (Any Two) 08

- 1) Describe ultra structure and functions of Chloroplast.
- 2) Describe signal transduction via G-protein coupled receptors.
- 3) Explain process of translation in prokaryotes.

B) Answer the following:- (Any One) 06

- 1) Describe different types of mutations with suitable examples.
- 2) Explain process of mitosis with neat labeled diagrams.

Q.4. A) Answer the following. (Any Two) 10

- 1) Describe ultra structure of typical plan cell.
- 2) Describe process of apoptosis.
- 3) Explain law of independent inheritance with suitable example.

B) Answer the following:- (Any One) 04

- 1) Describe process of DNA replication in bacteria.
- 2) Explain regulation of gene expression in lactose operon.

Q.5. Answer the following. (Any Two) 14

- a) Describe mechanisms of D-loop model of DNA replication.
- b) Explain types of active transport with suitable examples.
- c) Explain protein trafficking in mitochondria and endoplasmic reticulum.

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M.Sc. (Semester – I) (CBCS) Examination Nov/Dec-2018
Bioinformatics
INTRODUCTION TO HTML & BIOSTATISTICS

Time: 2½ Hours

Max. Marks: 70

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Q.1 Complete the sentences by selecting correct answer fm the given alternatives:- **14**

- 1) The most frequently occurring value in the data set is called _____.
 a) spread
 b) mode
 c) skewness
 d) median
- 2) _____ tag inserts a line horizontally on your web page.
 a) <hr>
 b) <line>
 c) <line direction="horizontal">
 d) <tr>
- 3) Tags and test that are not directly displayed on the page are written in _____ section.
 a) <html>
 b) <head>
 c) <title>
 d) <body>
- 4) _____ connects web page.
 a) Connector
 b) Line
 c) Hyperlink
 d) Net
- 5) The first page of a website is called _____.
 a) Design page
 b) Home page
 c) First page
 d) Main page
- 6) _____ is considered as the father of Biostatistics.
 a) Newton
 b) Denis Ritchie
 c) Sir Francis Galton
 d) Mendel
- 7) A _____ tag is used to display the image.
 a) picture
 b) image
 c) img
 d) Src
- 8) _____ is the correct HTML tag for adding a background color.
 a) <body color="yellow">
 b) <body bgcolor="yellow">
 c) <background>yellow</background>
 d) <body background="yellow">
- 9) Internet Explorer is _____.
 a) An Icon
 b) A File Manager
 c) A Browser
 d) The Internet
- 10) Mean of a set of values is based on _____.
 a) all values
 b) fifty percent values
 c) First and last value
 d) max and min values

- 11) _____ is the standard text editor that comes with the Microsoft windows operating system.
- a) WordPad
 - b) Excel
 - c) PPT
 - d) Notepad
- 12) In biostatistics, group of individuals taken for study is called as _____.
- a) block
 - b) population
 - c) group
 - d) flock
- 13) The characteristics or quantity that may vary from one individual to another is called _____.
- a) static group
 - b) dynamic group
 - c) dynamism
 - d) variable
- 14) Variables whose values cannot be expressed numerically are called _____.
- a) Qualitative variable
 - b) Quantitative variables
 - c) Absolute variables
 - d) Continuous variables

Q.2. A) Answer any four of the following **08**

- 1) What is the meaning of Mark-up language?
- 2) Define web page.
- 3) Write types of Lists in html.
- 4) Define Biostatistics.
- 5) Write different types of data representation.

B) Write notes on (Any Two) **06**

- 1) MATLAB
- 2) Random variable
- 3) Formatting tags.

Q.3. A) Answer the following. (Any Two) **08**

- 1) Explain in detail account of History of HTML.
- 2) Describe all attributes of table in detail.
- 3) Write note on test for significance.

B) Answer the following:- (Any One) **06**

- 1) Write and explain applications of biostatistics.
- 2) Design a simple web page of biological database by using html tags.

Q.4. A) Answer the following. (Any Two) **10**

- 1) Explain all body tags in details also write small program on it.
- 2) Write merits and demerits of Median.
- 3) Design a frame template by using HTML.

B) Answer the following:- (Any One) **04**

- 1) Explain form elements in detail.
- 2) Write a note on ANOVA.

Q.5. Answer the following. (Any Two) **14**

- a) Design simple registration form using all form tags.
- b) Find the mode from the following data:-

Marks	0-10	10-20	20-30	30-40	40-50	50-60
No. of students	3	8	15	20	10	4

- c) Write a note on Ordered & Non-Ordered lists.

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M.Sc. (Semester - I) (CBCS) Examination Nov/Dec-2018

Bioinformatics

INTRODUCTION TO PROGRAMMING LANGUAGES & PROGRAMMING THROUGH C & C++

Time: 2½ Hours

Max. Marks: 70

Instructions: 1) All questions are compulsory.
2) Figures to the right indicate full marks.

Q.1 Complete the sentences by selecting correct answer fm the given alternatives:- **14**

- 1) OOPs stand for _____.
- | | |
|---------------------------------|--------------------------------|
| a) Oracle Oriented Programming | b) Object Oriented programming |
| c) Operand oriented Programming | d) Open Oriented Project |

- 2) The output of the code below is _____

```
#include<stdio.h>
void main()
{
    int x=5;
    if (x<1)
        printf("hello");
    if(x == 5)
        printf("hi");
    else
        printf("no");
}
```

- | | |
|-------|------------|
| a) hi | b) hello |
| c) no | d) hihello |

- 3) The _____ is the output of this C code.

```
#include<stdio.h>
void main()
{
    int i = 2;
    do
    {
        printf("Hi");
    } while (i<2)
}
```

- | | |
|-----------------------|-----------|
| a) Compile time error | b) Hi Hi |
| c) Hi | d) Varies |

- 4) _____ is the output of the following code.

```
#include<stdio.h>
main()
{
    const int a = 5;
    a++;
    printf("%d", a);
}
```

- | | |
|------------------|------------------|
| a) 5 | b) 6 |
| c) Runtime error | d) Compile error |

- 5) _____ is a set of instructions to do complete a particular task.
 - a) Program
 - b) Algorithm
 - c) Calculation
 - d) Debug
- 6) _____ is the keyword used to make a class.
 - a) class
 - b) struct
 - c) int
 - d) float
- 7) _____ is valid C expression.
 - a) int my_num = 100,000;
 - b) int my_num = 10000;
 - c) int my num = 1000;
 - d) int \$my_num = 10000;
- 8) _____ Operating System is almost coded in C.
 - a) Linux
 - b) UNIX
 - c) Microsoft
 - d) Mac OS
- 9) Every C Statement must end with a _____.
 - a) Colon (:)
 - b) Comma (,)
 - c) Slash(/)
 - d) Semicolon(;
- 10) C++ is an OOP language developed by _____.
 - a) Dennis Ritchie
 - b) Larry Ellison
 - c) Bjarne Stroustrup
 - d) E. Khann
- 11) _____ is the process of wrapping up data and functions into a single unit (called class).
 - a) Encapsulation
 - b) Inheritance
 - c) Handling
 - d) Polymorphism
- 12) _____ is a scope resolution symbol.
 - a) ;
 - b) :
 - c) " "
 - d) ::
- 13) _____ plays an important role in initializing objects.
 - a) Pointer
 - b) Constructor
 - c) Destructor
 - d) Operator
- 14) C++ uses a unique keyword called this to represent an object that invokes a _____ function.
 - a) Member
 - b) Virtual
 - c) Friend
 - d) Private

Q.2. A) Answer any four of the following. 08

- 1) Define Pointer.
- 2) What is mean by Polymorphism?
- 3) Define Identifier.
- 4) What is different ways to create a program?
- 5) Write types of loops with example.

B) Write notes on. (Any Two) 06

- 1) Write a note on Programming Language.
- 2) Explain in detail decision making statements in C.
- 3) Explain data types in C++.

Q.3. A) Answer the following. (Any Two) 08

- 1) Write a note on History of C.
- 2) Explain in detail Array in C, also explain its types.
- 3) Write small program on addition of two numbers with output.

B) Answer the following:- (Any One) 06

- 1) Write a note on Operator in C++.
- 2) Write a short note on Pointers with example.

- Q.4. A) Answer the following. (Any Two)** **10**
- 1) Explain in detail Overloading?
 - 2) What is Inheritance? Explain the types of Inheritance.
 - 3) Conditional Statements with example in C
- B) Answer the following:- (Any One)** **04**
- 1) Explain in detail Polymorphism.
 - 2) Briefly explain the structure of C Program.
- Q.5. Answer the following. (Any Two)** **14**
- a) Write a note on File Handling in C programming.
 - b) Write C++ program on String function.
 - c) Explain Dynamic memory Allocation in C.

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M.Sc. (Semester - II) (CBCS) Examination Nov/Dec-2018
Bioinformatics
ADVANCED BIOINFORMATICS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, 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.

Section – I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07

- 1) _____ is clustering method for the creation of Phylogenetic trees created by Naruya Saitou and Nei in 1987.
 - a) MP
 - b) ML
 - c) UPGMA
 - d) N-J
- 2) The _____ based method makes predictions based on significant matches of the query sequence with sequences of known genes.
 - a) Ab initio
 - b) Homology
 - c) HMM
 - d) Neural network
- 3) _____ is the replacement of a single amino acid in the primary structure of a protein with another single amino acid, which is accepted by the processes of natural selection.
 - a) PAM
 - b) BLOSUM
 - c) Pairwise
 - d) Multiple
- 4) _____ plant database resource for integrative and comparative plant genome research.
 - a) Pathogen
 - b) PHI BASE
 - c) MIPS
 - d) All of these
- 5) ORF stands for _____.
 - a) Open reading frequency
 - b) Open random frame
 - c) Open reading Frame
 - d) None of these
- 6) _____ is a web-based program that combines neural network with multiple sequence alignment.
 - a) PSI PRED
 - b) PHD
 - c) Protparam
 - d) pfam
- 7) _____ is a technique used by molecular biologists to produce a snapshot of the messenger RNA population.
 - a) OMIM
 - b) SNP
 - c) SIFT
 - d) SAGE

B) Definitions

- 1) Sequence identity
- 2) Chip
- 3) Coil
- 4) Suffix Tree
- 5) Protparam
- 6) Rooted Tree
- 7) Profile

Section – II

Answer any four of the following.

- Q2** Explain identification of SNP in disease and SNP database with its applications. **14**
- Q3** Explain in detail UPGMA, NJ, Maximum Parsimony phylogenetic method in details. **14**
- Q4** Explain the gene prediction in prokaryotic and eukaryotic in details and add a note on plant and animal database. **14**
- Q5** **Answer any two of the following.** **14**
- a) Write a note on ExPasy server.
 - b) Explain KEGG database in detail.
 - c) Write a note on DNA microarray and its applications.
- Q6** **Write short notes on. (Any two)** **14**
- a) Smith-waterman algorithm
 - b) OMIM database
 - c) PSI and Mega Blast

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M.Sc. (Semester - II) (CBCS) Examination Nov/Dec-2018
Bioinformatics
MICROBIOLOGY AND BIOTECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, 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.

Section – I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07

- The concept of totipotency was proposed by _____.
a) Haberlandt b) Skoog
c) Cocking d) Miller
- The genome size of mycoplasma is _____.
a) 1.5 - 2.5mbps b) 1.7 - 2.3mbps
c) 2.0 - 2.2mbps d) 0.5 - 1.3 mbps
- _____ Hormone used to induce shoots in plant.
a) Gibberellins b) Cytokines
c) Both a & b d) None
- Malachite green is used in _____ structural staining.
a) Cell wall b) Capsule
c) Endospore d) Flagella
- LacZ gene is present in _____ plasmid.
a) pUC19 b) pBR322
c) pUC18 d) Both a & c
- Serum media is used in _____.
a) Plant cell culture b) Animal cell culture
c) Bacterial d) None
- Molecular taxonomy is based on _____.
a) 28S rRNA b) 16S rRNA
c) 30S rRNA d) None of these

B) Definitions: 07

- DNA vaccine
- HindIII
- Bacteriophage λ
- Nucleoid
- ICSB
- Clustal W
- Lytic cycle

Section – II

Answer any four of the following.

- Q2** Explain general characteristics and classification of plant viruses. **14**
- Q3** Explain the different artificial media used in animal cell culture media. **14**
- Q4** Explain the technique of Sanger's method of DNA sequencing **14**
- Q5** **Answer any two of the following.** **14**
- a) Explain the different staining techniques.
 - b) Molecular genetic analysis of human diseases.
 - c) Write a note on bacterial Transformation.
- Q6** **Write short notes any two of the following.** **14**
- a) GMOs advantages and disadvantages.
 - b) Gene therapy
 - c) Phylogenetic tree

Part – II**Answer any four of the following**

- Q.2** Explain the structural classification of proteins. **14**
- Q.3** Write a detailed note on innate immunity. **14**
- Q.4** Explain different types of antigen antibody interactions. **14**
- Q.5** **Answer any two of the following** **14**
- a) Write a note on functions of vitamins.
 - b) Add a note on classifications of nucleic acids.
 - c) Define enzyme. Write a note on their classification.
- Q.6** **Write short notes on any two** **14**
- a) Protein folding
 - b) Cytokines
 - c) Hybridoma technology

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M.Sc. (Semester - II) (CBCS) Examination Nov/Dec-2018
Bioinformatics
INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

Time: 2½ Hours

Max. 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) Answer to the Part-I and Part-II are to be written in same answer Booklet only.

Part – I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07

- 1) Out of following _____ is found to be most carcinogenic.
 - a) PAH
 - b) Heavy metals
 - c) Textile dyes
 - d) Air Pollutants
- 2) Phenyl acetic acid acts as a precursor for the production of _____.
 - a) Penicillin V
 - b) Penicillin G
 - c) Penicillin M
 - d) Cyclosporine
- 3) In Bioreactors _____ are used to prevent vortex formation.
 - a) Spargers
 - b) Impellers
 - c) Baffles
 - d) Both B & C
- 4) Amylase is a starch hydrolyzing enzyme can be obtained by using _____.
 - a) *A. Oryzae*
 - b) *S. Cerevisiae*
 - c) *B. Licheniformis*
 - d) Both A & C
- 5) Which of the following techniques are used to maintenances of cultures
 - a) Slant Culture
 - b) Glycerol Storage technique
 - c) Lyophilized form technique
 - d) All of these
- 6) Computers are used in Bioreactor for
 - a) Data acquisition
 - b) Data analysis
 - c) A+B
 - d) Either A or B
- 7) Which of the following are Antifoaming Agent?
 - a) Alcohol
 - b) Esters
 - c) Silicones
 - d) All of these

B) Definitions 07

- 1) Microbial Nutrition
- 2) Microbial Enzyme
- 3) SCP
- 4) Bio indicator
- 5) Bioremediation
- 6) Environmental Policy
- 7) Environmental impact assessment

Part – II

Answer any four of the following

- Q2** Describe about the microbial cell cultivation system. **14**
- Q3** Discuss in brief on Kinetics of Microbial growth. **14**
- Q4** Write in details of solid waste management. **14**
- Q5** **Answer any two of the following** **14**
- a) Biotechnology for clean environmental
 - b) Heavy metal resistance in microbes
 - c) Streptomycin production
- Q6** **Answer any two of the following** **14**
- a) Air and media sterilization
 - b) Measurement and control of bioprocess parameters
 - c) Degradation of dyes

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M.Sc. (Semester - III) (CBCS) Examination Nov/Dec-2018
Bioinformatics
BIOLOGICAL DATABASE MANAGEMENT SYSTEM

Time: 2½ Hours

Max. Marks: 70

Instructions: 1) All questions are compulsory
 2) Figures to the right indicate full marks.

Q.1 Complete the sentences by selecting correct answer fm the given alternatives:- **14**

- 1) In the relational modes, cardinality is termed as _____.
 a) Number of tuples
 b) Number of attributes
 c) Number of tables
 d) Number of constraints
- 2) Cartesian product in relational algebra is _____.
 a) A Unary operator
 b) A Binary operator
 c) A Ternary operator
 d) Not defined
- 3) DML is provided for _____.
 a) Description of logical structure of database
 b) Addition of new structures in the database system
 c) Manipulation & processing of database
 d) Definition of physical structure of database system
- 4) In a relational model, relations are termed as _____.
 a) Tuples
 b) Attributes
 c) Tables
 d) Rows
- 5) An entity set that does not have sufficient attributes to form a primary key is a _____.
 a) Strong entity set
 b) Weak entity set
 c) Simple entity set
 d) Primary entity set
- 6) In a Hierarchical model records are organized as _____.
 a) Graph
 b) List
 c) Links
 d) Tree
- 7) Related fields in a database are grouped to form a _____.
 a) Data file
 b) Data record
 c) Menu
 d) Bank
- 8) In an E-R diagram an entity set is represent by a _____.
 a) Rectangle
 b) Ellipse
 c) Diamond box
 d) Circle
- 9) A table joined with itself is called _____.
 a) Join
 b) Self join
 c) Outer join
 d) Equi join
- 10) Which of the following is used to declare a record?
 a) %ROWTYPE
 b) %TYPE
 c) %CHAR
 d) %DATE

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M.Sc. (Semester - III) (CBCS) Examination Nov/Dec-2018
Bioinformatics
ADVANCED BIOPHYSICAL TECHNIQUES

Time: 2½ Hours

Max. Marks: 70

Instructions: 1) All questions are compulsory.
 2) Figures to the right indicate full marks.

Q.1 Multiple choice Questions:-**14**

- 1) _____ of the intermolecular bonding interactions below are possible for a secondary amide.
 - a) Hydrogen bonding only
 - b) Vander Waals Interactions Only
 - c) Ionic Bonding Only
 - d) Both hydrogen Bonding and ionic Bonding
- 2) _____ of the following statements is true regarding a secondary amide.
 - a) It can only participate in hydrogen bonding as a hydrogen bond donor
 - b) It can only participate in hydrogen bonding as a hydrogen bond acceptor
 - c) It can participate in hydrogen bonding both as a hydrogen bond donor and a hydrogen bond acceptor
 - d) It cannot participate in hydrogen bonding at all
- 3) _____ of the following major aims in drug design is not related to the pharmacodynamics of a drug.
 - a) The reduction of side effects
 - b) The maximization of activity
 - c) The reduction of toxicity
 - d) The maximization of oral bioavailability
- 4) _____ of the following is a noble gas configuration.

a) $1s^2 2s^2$	b) $1s^2 2s^2 2p^6$
c) $1s^2 2s^2 2p^6 3s^2$	d) $1s^2 2s^2 2p^6 3s^2 3p^6 3d^{10}$
- 5) There are _____ types of molecular orbitals.

a) 1	b) 2
c) 3	d) 4
- 6) _____ of the following is non-polar bond.

a) C-H	b) C=O
c) N-H	d) C-C
- 7) _____ of the following bonds is most strongly polarized.

a) C-H	b) C=O
c) N-H	d) C-N
- 8) _____ of the following molecules will not display an infrared spectrum.

a) CO ₂	b) N ₂
c) Benzene	d) HCCH
- 9) _____ One of the following nuclei has a magnetic moment (so that an NMR experiment can be performed).

a) ¹² C	b) ¹⁶ O
c) ¹⁴ N	d) ³² S

- 10) In a proton NMR experiment with a frequency (ν) of 60 MHz, the magnetic field B require for resonance is 1.4 T. calculate the magnetic field required for resonance of the proton in a spectrometer with a frequency of 500 MHz.
- a) 2.8 T b) 11.7 T
c) 0.7 T d) 14.0 T
- 11) In a time-of-flight mass spectrometer, the velocity ν of an accelerated ion is related to its mass by _____ of the following.
- a) Proportion to m (its Mass)
b) Inversely proportional to its mass
c) Proportional to the square root of its mass
d) Inversely proportional to the square root of its mass
- 12) For the molecule CBr₄, the number of peaks which comprise the cluster for the molecular ion will be _____ of the following.
- a) 1 b) 4
c) 5 d) 3
- 13) A device which converts electrical energy in the form of a current into optical energy is called as _____.
- a) Optical source b) Optical coupler
c) Optical isolator d) Circulator
- 14) Identify _____ of the following pairs of molecules exhibits both a pure rotational spectrum and a rotational Raman spectrum.
- a) O₂ and H₂O b) CO₂ and N₂O
c) CO and CH₄ d) NO and DCCH

Q.2. A) Answer any four of the following. 08

- 1) Valency
- 2) Hydrogen bond
- 3) Spectroscopy
- 4) Circular Dichroism
- 5) Cuvette

B) Write notes on. (Any Two) 06

- 1) X-radiation
- 2) Atomic Force microscopy
- 3) Electron density

Q.3. A) Answer the following. (Any Two) 08

- 1) Non-bonding interactions
- 2) Instrumentation of UV-Visible spectrophotometer
- 3) Difference between of CD and ORD.

B) Answer the following:- (Any One) 06

- 1) Write the principle of MALDI TOF.
- 2) Brief out Electromagnetic spectrum.

Q.4. A) Answer the following. (Any Two) 10

- 1) Explain the X-Ray Diffraction.
- 2) Explain principle of Scanning Electron Microscopy.
- 3) Add a note on Fluorescent microscopy.

B) Answer the following:- (Any One)**04**

- 1) Define covalent bond. Add a note on its types.
- 2) Write the working of FTIR.

Q.5. Answer the following (Any Two)**14**

- a) Briefly explain the principles and theory and instrumentation of NMR
- b) Discuss the types of lasers with examples.
- c) Application of X-rays in medicine

Seat
No.

Set P

**M.Sc. (Semester - III) (CBCS) Examination Nov/Dec-2018
Bioinformatics**

COMPUTATIONAL STRUCTURE BIOLOGY AND DRUG DESIGNING

Time: 2½ Hours

Max. Marks: 70

Instructions: 1) All questions are compulsory
2) Figures to the right indicate full marks.

Q.1 Multiple choice Questions:-**14**

- 1) _____ is web based service for analysis, visualization and validation of NMR structure.
 - a) Vivaldi
 - b) Olderado
 - c) Nmrcore
 - d) Nmrclust
- 2) Metabolism of an oral drug via the liver is called _____.
 - a) First pass metabolism
 - b) Second pass metabolism
 - c) Last pass metabolism
 - d) Drug pass metabolism
- 3) The secondary structure is stabilized by hydrogen bonds between residue I & _____.
 - a) i+5
 - b) i+7
 - c) i+4
 - d) i+2
- 4) Polar surface area of drug should be _____.
 - a) <120 Å²
 - b) <140 Å²
 - c) <150 Å²
 - d) <200 Å²
- 5) _____ is database of protein models generated by homology programme.
 - a) PDB
 - b) CSA
 - c) Modbase
 - d) 3D crunch
- 6) Drugs are approved by _____.
 - a) FAD
 - b) FDD
 - c) FDA
 - d) FAAD
- 7) _____ is a method of protein modeling which is used to model those proteins that do not have homologous proteins with known structure.
 - a) Helix prediction
 - b) Protein prediction
 - c) Protein threading
 - d) Secondary structure
- 8) _____ is the major drug metabolizing enzymes.
 - a) CYP2C19
 - b) CYP2A
 - c) CYP2D6
 - d) CYP450
- 9) The _____ loop refers to a single stranded region connecting two adjacent base paired segments to form bubbles.
 - a) Buldge
 - b) Interior
 - c) Multibranch
 - d) Hairpin
- 10) Pharmacologically inactive compounds are called _____.
 - a) Prodrug
 - b) Predrug
 - c) Postdrug
 - d) Biodrug

Seat No.	
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Set **P**

M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Bioinformatics
BIOLOGICAL SIMULATIONS AND MODELING

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, 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.

Section – I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: **07**

- 1) Python was developed by _____.
 a) Stave Jobs
 b) Dennis Ritchi
 c) Guido van Rossum
 d) None
- 2) _____ is a named piece of memory that can store a value.
 a) Constant
 b) Array
 c) Static
 d) Variable
- 3) IDLE stands for _____.
 a) Integrated Development Environment
 b) Invented Development Environment
 c) Independent Development Environment
 d) None of these
- 4) _____ is a sequence of text characters in a program.
 a) Code
 b) String
 c) Program
 d) Data types
- 5) Simulation is mimicking of _____.
 a) Virtual event
 b) Real event
 c) Both a & b
 d) None
- 6) Simulation finds its application in _____.
 a) Physics
 b) Chemistry
 c) Biology
 d) All
- 7) Energy is a parameter of _____.
 a) MD
 b) MC
 c) Both a & b
 d) None

B) Definitions: **07**

- 1) Class
- 2) Generators
- 3) Methods
- 4) Dictionary
- 5) Simulation
- 6) Bacterial model
- 7) Force Field

Section – II

- Q.2** Write a note on principles and applications of simulations. **14**
- Q.3** Write features of python? Explain features in detail. **14**
- Q.4** Write a note on molecular mechanics with reference to bio-molecules. **14**
- Q.5 Answer any two of the following. 14**
- a) What is list? Explain with example.
 - b) Explain python Tuples with syntax and example.
 - c) Add a note on biological models of simulations.
- Q.6 Write short notes on. (Any two) 14**
- a) Characteristics of Python.
 - b) Energy minimization in simulations.
 - c) Examples of molecular dynamics

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Bioinformatics
CLINICAL BIOINFORMATICS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, 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

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07

- 1) AB SOLID 3 System generates over _____ gigabases per turn.

a) 30	b) 20
c) 15	d) 50
- 2) _____ locates the pair of genes on the chromosomes.

a) Map Viewer	b) Linkage
c) Genetic Mapping	d) All of these
- 3) _____ disease is progressive loss of function of neurons including death of neuron.

a) Alzheimer's	b) Huntigton's
c) Parkinsons	d) All of these
- 4) A wide variety of microarray analysis tool written in _____.

a) C	b) C++
c) Python	d) R
- 5) _____ jointly sponsored by American College of Surgeons & American Society.

a) NCDB	b) MHDC
c) NHRD	d) PHIBASE
- 6) _____ is the intermediates and products of metabolism.

a) Metabolites	b) Genomics
c) Proteomics	d) None
- 7) _____ to determine the amount to paid to provider.

a) Provider	b) Payer
c) Patient	d) Hospital

B) Definitions. 07

- 1) Linkage
- 2) COPD
- 3) Clinical Data Management
- 4) Adverse Drug Reaction
- 5) ChIP
- 6) Transcriptomics
- 7) System Dynamics

Part – II

Answer any four of the following

- Q.2** Explain Host Pathogen interaction in detail and add a note on host pathogen interaction database. **14**
- Q.3** Give a brief account on pharmacogenomics and their application in details. **14**
- Q.4** Write in detail Next Generation Sequencing QC tools and add a note on basic NGS Chemistry. **14**
- Q.5** **Answer any two of the following.** **14**
- a) Explain pathology informatics in details.
 - b) Explain De Novo genome sequencing
 - c) Explain goals and future challenges in Human Genome Project.
- Q.6** **Write short notes any two of the following.** **14**
- a) International Classification disease
 - b) NGS Platforms
 - c) Ensembl Database

Seat No.	
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**M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Bioinformatics**

RESEARCH METHODOLOGY AND IPR IN BIOINFORMATICS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, 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.

Section – I

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07

- 1) _____ of the following is a major method of data collection.
 - a) Questionnaires
 - b) Secondary data
 - c) Interviews
 - d) All of these
- 2) It is in this section that you fully interpret & evaluate your results _____ .
 - a) Introduction
 - b) Method
 - c) Results
 - d) Discussion
- 3) A literature review requires _____.
 - a) Planning
 - b) Clear writing
 - c) Good writing
 - d) All of these
- 4) When citation includes more than _____ authors, only the surname of the author is cited followed by *et al.*
 - a) 2
 - b) 4
 - c) 5
 - d) 6
- 5) The term 'Intellectual Property Rights' covers _____.
 - a) Copyright
 - b) Patent
 - c) Trade dress
 - d) All of the above
- 6) World Intellectual Property Organization was established in _____.
 - a) 14 March, 1959
 - b) 14 July, 1967
 - c) 14 August, 1965
 - d) 14 October, 1960
- 7) _____ is a preferred sampling method for the population with finite size.
 - a) Area sampling
 - b) Cluster sampling
 - c) Purposive sampling
 - d) Systematic sampling

B) Definitions. 07

- 1) Scientific journal
- 2) Research report
- 3) ANOVA
- 4) Hypothesis
- 5) Trade secrets
- 6) Impact factor
- 7) Fundamental research

Section – II**Answer any four of the following.**

- Q2** Explain in detail the title and abstract guidelines for preparation manuscript. **14**
- Q3** What is Sampling? Explain in detail Types of Sampling. **14**
- Q4** What is research methodology? Explain in detail steps in research. **14**
- Q5** **Answer any two of the following.** **14**
- a) Write a note patenting of biological materials.
 - b) Write a note computer and internet application in research.
 - c) Write a note on Review of Literature.
- Q6** **Answer any two of the following.** **14**
- a) Intellectual property
 - b) Sampling and non sampling error
 - c) Plant variety protection in India

Seat No.	
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M.Sc. (Semester - IV) (New) (CBCS) Examination Nov/Dec-2018
Bioinformatics
EMERGING AREAS OF BIOINFORMATICS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, 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

Q.1 A) Rewrite the sentence after choosing the correct answer from the given alternatives: 07

- 1) _____ is a multilateral treaty to protect endangered plants and animals.

a) SITES	b) ISBN
c) ICZN	d) CITES
- 2) The most formats was created by _____ Information Systems.

a) MDL	b) SDF
c) US	d) Canada
- 3) _____ medicine is a medical procedure that separates patients into different groups.

a) genetic	b) Natural
c) Preservative	d) Personalized
- 4) MHCpred 2.0 an updated quantitative _____ epitope prediction server.

a) B-Cell	b) Cytotoxic
c) T-Cell	d) All
- 5) The _____ is a complex system of the human body and understanding it is one of the most challenging topics in biology.

a) Blood	b) immune
c) Respiratory	d) Reproductive
- 6) _____ coined the term the nanotechnology.

a) Richard Fyemann	b) Nario Taniguchi
c) Gopal Chandra	d) Robert Koch
- 7) _____ is a database of chemicals which is owned by the Royal Society of Chemistry.

a) ChemSpider	b) Pubchem
c) Zinc	d) ChEBI

B) Definitions

07

- 1) QSPR
- 2) 2D compounds
- 3) Polyphen
- 4) Nano
- 5) Disease
- 6) CML
- 7) TDWG

Part – II**Answer any four of the following**

- Q2** Explain different chemical file format and add a note on chemical database. **14**
- Q3** Give a detailed account on Biodiversity informatics and explain the molecular data types in phylogenic study. **14**
- Q4** Explain in brief about the immunoinformatics and add a note on reverse vaccinology. **14**
- Q5** **Answer any two of the following** **14**
- a) Write a note on personalized medicine in details.
 - b) Describe physical method for synthesis of nanomaterials.
 - c) Write a note on MHC prediction in detail.
- Q6** **Answer any two of the following** **14**
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 - b) SNP database
 - c) Species 2000

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Set **P**

M.Sc. (Semester - IV) (Old) (CBCS) Examination Nov/Dec-2018
Bioinformatics
BIOLOGICAL SIMULATIONS AND MODELING

Time: 2½ Hours

Max. Marks: 70

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Set **P**

M.Sc. (Semester - IV) (Old) (CBCS) Examination Nov/Dec-2018
Bioinformatics
CLINICAL BIOINFORMATICS

Time: 2½ Hours

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M.Sc. (Semester - IV) (Old) (CBCS) Examination Nov/Dec-2018
Bioinformatics
EMERGING AREAS OF BIOINFORMATICS

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07

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