Seat No.	

M.Sc. (Semester – I) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Basic Bioinformatics (MSC27101)

Day & Date: Wednesday, 19-07-2023   Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
　　　　　　　　2) Attempt any Three questions from Q. No. 3 to Q. No. 7.
　　　　　　　　3) Figure to the right indicate full marks.

Q.1 A) Choose the correct alternatives from the given options.　　　　　**10**

1) _____ a tree in which a special ("labeled") node is singled out.
   a) Unrooted tree　　　　　b) Rooted tree
   c) guide tree　　　　　　　d) dendrogram tree

2) _____ algorithm is used by Global alignment.
   a) Needleman and Wunsch　b) Smith-Waterman
   c) BLAST　　　　　　　　　d) PAM

3) _____ database is a Microarray gene expression database studying in bioinformatics.
   a) SWISS-PROT　　　　　　b) GEO
   c) DDBJ　　　　　　　　　d) EST

4) _____ is a database that uses multiple alignments derived from the most conserved, ungapped regions of homologous protein sequences.
   a) DOMAIN　　　　　　　　b) BLOCKS
   c) SMART　　　　　　　　　d) SCOPE

5) PAM matrix was developed by _____.
   a) Margaret Dayhoff　　　　b) Paulin Hogeweg
   c) David Lipman　　　　　　d) Stephen Altschul

6) Multiple sequence alignments used to know _____.
   a) Sequence identity
   b) Conserved sequence
   c) Consensus
   d) Consensus and conserved sequence

7) The _____ microarray is a collection of microscopic protein spots attached to a solid surface.
   a) Protein　　　　　　　　b) RNA
   c) DNA　　　　　　　　　　d) lipid

8) _____ tool is used for nucleotide homologous sequence search.
   a) Primer 3　　　　　　　　b) BLSATn
   c) Chimera　　　　　　　　d) Primer model

9) The structural conserved part of DNA/Protein having independent function is called _____.
   a) motif　　　　　　　　　b) Domain
   c) Consensus　　　　　　　d) Promoters

10) Based on length the sequence alignment is classified in to _____.
a) 2   b) 3
c) 4   d) 5

B) Fill in the blanks.   **06**
1) k-tup method is used in _____.
2) _____ is a search engine in DDBJ.
3) _____ tool is used for sequence submission at ENA database.
4) _____ values in a phylogenetic tree indicate that out of 100, how many times the same branch is observed when repeating the generation of a phylogenetic tree on a resampled set of data.
5) _____ nucleotide or amino acid sequence in which each nucleotide or amino acid is the one which occurs most frequently at that site in the different sequences.
6) _____ is used when you want to compare a nucleotide sequence to a protein DB.

Q.2 Answer the following.   **16**
a) Write a note on elements of phylogeny.
b) Describe Scope and applications of Bioinformatics.
c) Explain in detail about FASTA.
d) Explain *in silico* primer designing.

Q.3 Answer the following.
a) Explain the primary protein sequence database.   **10**
b) Explain smith-Waterman and Needleman-Wunch algorithm.   **06**

Q.4 Answer the following.
a) Explain types of machine learning methods with advantages.   **10**
b) Describe the character-based methods for phylogenetic tree construction.   **06**

Q.5 Answer the following.
a) Explain literature database PubMed and PMC.   **10**
b) Describe the human genome database.   **06**

Q.6 Answer the following.
a) What is alignment? Explain multiple sequence alignment using ClustalW.   **10**
b) Explain BLAST and its variants.   **06**

Q.7 Answer the following.
a) Explain Local and Global alignment.   **10**
b) Write a note on ANN and HMM with their applications.   **06**

Seat No.

M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Cell Biology and Genetics (MSC27102)

Day & Date: Thursday, 20-07-2023   Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
               2) Attempt any Three questions from Q.No.3 to Q.No.7.
               3) Figures to the right indicate full marks.

Q.1 A) Choose the correct alternatives from the options.   **10**

1) _____ type of ribosome's found in eukaryotic cells.
   a) 80 S   b) 70 S
   c) 60 S   d) 50 S

2) _____ enzyme responsible for polyadenylation.
   a) RNA Polymerase   b) DNA Polymerase
   c) Helicase   d) Poly A polymaerase

3) _____ cell organelle exclusively found in only Plant cells.
   a) Nucleus   b) Mitochondria
   c) Chloroplast   d) ribosome

4) _____ cell organelle engaged in ATP synthesis.
   a) Cytoplasm   b) Mitochondria
   c) Chloroplast   d) Nucleus

5) The phenotypic ratio of F2 generation in typical Mendelian monohybrid cross is _____.
   a) 1:2:1   b) 1:1:2
   c) 2:1:1   d) 3:1

6) _____ enzymes play important role in apoptosis.
   a) Nucleases   b) DNases
   c) RNases   d) Caspases

7) The enzyme involved in unwinding of DNA is _____.
   a) RNA Polymerase   b) DNA Polymerase
   c) Helicase   d) Gyrase

8) Eukaryotic Transcription takes place in _____.
   a) ribosome   b) cytoplasm
   c) nucleoplasm   d) cell membrane

9) The anti-codons are found on _____.
   a) mRNA   b) rRNA
   c) tRNA   d) Ribosome

10) The example of biological mutagen is _____.
    a) Transposon   b) Enzyme
    c) Plasmid   d) Intron

B) Fill in the blanks   **06**
1) β-Galactosidase enzyme is encoded by _____ gene in *E. coli.*
2) Polyploid organisms contain more than _____ sets of chromosomes.
3) Programmed cell death is also known as _____.
4) _____ phase of cell cycle known as resting phase.
5) _____ model of DNA replication is used to replicate mtDNA.
6) _____ are the agents causing mutations.

Q.2 Answer the following.   **16**
   a) Describe protein trafficking in cells.
   b) Explain process of mitosis with neat labeled diagram.
   c) Describe G protein coupled signal transduction pathway.
   d) Write note on eukaryotic cell cycle.

Q.3 Answer the following.   **16**
   a) Describe structure of cell membrane.
   b) Give an account on nucleus.

Q.4 Answer the following.   **16**
   a) Describe mechanism of translation in prokaryotes.
   b) Explain rolling circle model of DNA replication.

Q.5 Answer the following.   **16**
   a) Write a short note on enzymes involved in DNA replication.
   b) Write a note on types of RNA with functions.

Q.6 Answer the following.   **16**
   a) Add a note on types of mutagens with examples.
   b) Explain base excision repair and nucleotide excision repair pathway.

Q.7 Answer the following.   **16**
   a) Write a note on transcription in eukaryotes.
   b) Describe regulation of tryptophan operon with neat labeled diagram.

Set No.		Set	P

M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Introduction to HTML & Biostatistics (MSC27103)

Day & Date: Friday, 21-07-2023 Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and. 2 are compulsory.
2) Attempt any three questions from Q. No. 3 to Q. No. 7
3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ) 10

1) _____ tag is used in HTML for inserting a line break.
   a) <a>　　　　　　　　　　b)
   c) <b>　　　　　　　　　　d) <pre>

2) In HTML tags are _____.
   a) In upper case　　　　　b) case sensitive
   c) in lower case　　　　　d) not case sensitive

3) _____ number of sizes of headers are available in HTML by default,
   a) 5　　　　　　　　　　　b) 1
   c) 3　　　　　　　　　　　d) 6

4) If a variable can take any value between 0 and 15 then this variable is called a _____ variable.
   a) Continuous　　　　　　b) Discrete and quantitative
   c) Discrete　　　　　　　d) continuous and qualitative

5) _____ is the relative measure of dispersion?
   a) Standard deviation
   b) Co efficient of quartile deviation
   c) Range
   d) Mean deviation

6) _____ is a statistical test used to compare observed results with expected results.
   a) z-test　　　　　　　　b) Mean
   c) t-test　　　　　　　　d) chi-square test

7) _____ tag is used to display text along with scrolling effect.
   a) <div>　　　　　　　　b) <scroll>
   c) <Marquee>　　　　　　d)

8) Nationality is an example of _____ level of measurement.
   a) Ordinal　　　　　　　b) Nominal
   c) Ratio　　　　　　　　d) Interval

9) HTML tags are enclosed within _____.
   a) { }　　　　　　　　　b) <>
   c) !!　　　　　　　　　　d) ( )

10) _____ tag is used to render an image on a webpage.
    a) Img　　　　　　　　　b) Src
    c) Image　　　　　　　　d) Pic

B) **Fill in the blanks OR Write true/false.** 06
1) The most frequent occurring observation in a data is called _____.
2) The abbreviation of HTML stand for _____.
3) _____ in HTML documents is surrounded by angular bracket which has a specific meaning.
4) _____ is a collection of interlinked web pages.
5) Any representative part of the population is known as _____.
6) The technique ANOVA was developed by _____.

Q.2 **Answer the following.** 16
a) Write a note on versions of HTML.
b) State the basic assumption in ANOVA technique.
c) Describe different editors of HTML.
d) Give the relationship between mean median and mode.

Q.3 **Answer the following.**
a) Describe the basic tags of HTML. 10
b) Distinguish between nominal and ordinal data with example. 06

Q.4 **Answer the following.**
a) What are the various formatting tags in HTML? 10
b) Describe the technique of ANOVA with an illustration for two-way classification model. 06

Q.5 **Answer the following.**
a) Write a note on graphical presentation of data. 10
b) Which tag is used for representing the results of a calculation? Explain its attributes. 06

Q.6 **Answer the following.**
a) Write a note on tags and attributes in HTML. 10
b) Explain random sample and sampling technique. 06

Q.7 **Answer the following.**
a) Write a note on MATLAB and its application. 10
b) Describe the test for significance of population correlation co efficient. 06

Set No.	

M.Sc. (Semester - I) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Introduction to Programming Languages & Programming Through C & C++ (MSC27108)

Day & Date: Saturday, 22-07-2023   Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
　　　　　　　2) Attempt any three questions from Q. No. 3 to Q. No. 7
　　　　　　　3) Figure to right indicate full marks.

Q.1　A)　Multiple Choice Questions.　　　　　　　　　　　　　　　　10

1) A byte consists of_____.
   a) One bit　　　　　　　　　b) Four bits
   c) Eight bits　　　　　　　　d) Sixteen bits

2) _____ is graphical representation of program.
   a) Protocol　　　　　　　　b) Flowchart
   c) Bar graph　　　　　　　　d) format

3) C has _____ keywords but number of built in functions.
   a) 55　　　　　　　　　　　b) 45
   c) 32　　　　　　　　　　　d) 32

4) _____ are used to execute instructions repeatedly until a specific condition is met.
   a) Statements　　　　　　　b) Loops
   c) Block　　　　　　　　　　d) Thread

5) The collection group of elements of similar or same data type is known as _____.
   a) Array　　　　　　　　　　b) Data warehouse
   c) Datasheet　　　　　　　　d) Group

6) C++ is a _____ language.
   a) JPP　　　　　　　　　　　b) Compiler
   c) OOP　　　　　　　　　　　d) DS

7) All preprocessor directives start with _____ symbol.
   a) %　　　　　　　　　　　　b) #
   c) $　　　　　　　　　　　　d) !

8) _____ define the essential characteristics of an object that distinguish it from all other kinds of objects.
   a) Encapsulation　　　　　　b) Inheritance
   c) Abstraction　　　　　　　d) Properties

9) In CPP, members of a class are_____ by default.
   a) Public　　　　　　　　　b) Private
   c) Protected　　　　　　　　d) Static

10) The_____ is used to terminate a statement.
    a) Quotes　　　　　　　　　b) Colon
    c) Semicolon　　　　　　　　d) Comma

B) Fill in the blanks. 06
1) The C Language is developed by _____.
2) The _____ function is used for output in C.
3) _____ is known as the founder of C++ language.
4) WWW stands for _____.
5) In C++, _____ is a special method which is invoked automatically at the time of object creation.
6) An _____ is simply a symbol that is used to perform operations.

Q.2 Answer the following. 16
a) Describe in detail History of C Language.
b) Define C Identifiers and explain its types.
c) Add a note on types programming Languages with examples.
d) Write structure of C++ and explain its data types

Q.3 Answer the following. 16
a) Write a brief account on C++ operators.
b) Explain in detail conditional statements in C with types.

Q.4 Answer the following. 16
a) Write a brief account on C functions.
b) Describe in detail pointers in C.

Q.5 Answer the following. 16
a) Explain in detail Array and its types.
b) Write and explain fundamentals of computer.

Q.6 Answer the following. 16
a) Write a note on history of C++.
b) Write a brief account on structure of C

Q.7 Answer the following. 16
a) Write Short note on operating system
b) Write and explain number systems in computer.

<table>
<tr><td>Set No.</td><td></td></tr>
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Set **P**

M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Advanced Bioinformatics (MSC27201)

Day & Date: Wednesday, 19-07-2023   Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
           2) Attempt any three questions from Q. No. 3 to Q. No. 7
           3) Figure to right indicate full marks.

Q.1 A) Choose the correct alternatives.   **10**

1) _____ is a Catalog of human genes and genetic disorders and traits, with a particular focus on the gene- phenotype relationship.
   a) PMC   b) Medline
   c) OMIM   d) KEGG

2) _____ type of SNPs that do not change the amino acid sequence of protein.
   a) Missense   b) Nonsynomous
   c) Synonymous   d) Nonsense

3) The major difference between _____ result and the typical Blast output is the presentation of the graph.
   a) delta   b) Mega
   c) Blast2   d) Psi

4) The scoring matrix based on global alignment is _____.
   a) PAM   b) PAN
   c) BLOSUM   d) BLOSMA

5) The segments of the protein that join alpha and Beta secondary structure elements together are called _____.
   a) loop   b) helix
   c) coil   d) zigzag

6) Palindrome programme looks for inverted repeats in a _____ sequence in Emboss.
   a) DNA   b) RNA
   c) mRNA   d) Protein

7) SCOP sorts the proteins _____ into classes, folds and superfamilies.
   a) architecture   b) Domains
   c) topology   d) homologous

8) _____ describes the *E. coli* genome and provides a molecular and functional catalog
   a) Brenda   b) EcoCyc
   c) Ecogenome   d) MetaCyc

9) Big data is a combination of _____.
   a) structured   b) semistructured
   c) unstructured   d) All of these

10) _____ is not a type of protein-protein interaction.
   a) Homo oligomeric
   b) Hetero oligomeric
   c) covalent
   d) amino interaction

B) Fill in the blanks. 06
   1) An assembly of integrated and interacting networks of genes, proteins and biochemical reactions _____.
   2) _____ is an open source framework for storing and processing big data sets.
   3) _____ is an online extensible and integrative bioinformatics resource for protein analysis.
   4) A _____ is a germline substitution of a single nucleotide at a specific position in present in a sufficiently large fraction of the population.
   5) _____ type of BLAST uses position-specific scoring matrix (PSSM) or profile.

Q.2 Answer the following. 16
   a) Write a note on types of scoring matrices.
   b) Give an account on structural and functional genomics.
   c) Describe different types of secondary structure of proteins.
   d) What is system biology? Add a note on its applications.

Q.3 Answer the following. 16
   a) Give a detailed account on EMBOSS package for sequence analysis.
   b) Write a note on Mega Blast, PSI Blast and gapped Blast.

Q.4 Answer the following. 16
   a) Explain in detail DNA microarray data analysis.
   b) Describe in details the identification of SNPs. Add a note SNP database.

Q.5 Answer the following. 16
   a) Explain protein structure classification database CATH and SCOP.
   b) Explain KEGG metabolic pathways database.

Q.6 Answer the following. 16
   a) Explain in detail pathway and regulatory network.
   b) Describe the overview of systems biology.

Q.7 Answer the following. 16
   a) Explain the techniques used in data mining.
   b) Write a note on components of data science.

Seat No.

M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Microbiology and Immunology (MSC27202)

Day & Date: Sunday, 23-07-2023　　　　　　　　　　　Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
　　　　　　　　2) Attempt any Three questions from Q.No.3 to Q.No.7.
　　　　　　　　3) Figures to the right indicate full marks.

Q.1　A)　Choose the correct alternatives from the options.　　　　　**10**

　　1)　_____ acts as genetic material in Coliphage PhiX174.
　　　　a)　DS RNA　　　　　　　　b)　SS RNA
　　　　c)　DS DNA　　　　　　　　d)　SS DNA

　　2)　In hypersensitivity reaction _____ play important role.
　　　　a)　IgG　　　　　　　　　　b)　IgE
　　　　c)　IgA　　　　　　　　　　d)　IgM

　　3)　Cytokine which acts as a growth factor of B-cell is _____.
　　　　a)　$IFN\gamma$　　　　　　　b)　IL-10
　　　　c)　IL-13　　　　　　　　　d)　$TNF\beta$

　　4)　_____ is pathogenic agent of AIDS.
　　　　a)　Retrovirus　　　　　　　b)　Prion
　　　　c)　Rhabdo virus　　　　　　d)　Retroprion

　　5)　All prokaryotes are surrounded by a cell wall except _____.
　　　　a)　Mycoplasms　　　　　　b)　Sperochetes
　　　　c)　Actinomycetes　　　　　d)　Methanogens

　　6)　_____ is optimum conditions used in hot air oven for sterilization.
　　　　a)　100°C for 1 hour　　　　b)　120°C for 1 hour
　　　　c)　160°C for 1 hour　　　　d)　60°C for 1 hour

　　7)　The basic structure of antibodies are _____.
　　　　a)　Y-shaped　　　　　　　b)　X-shaped
　　　　c)　Linear　　　　　　　　d)　Hyperbolic

　　8)　_____ is an example of acid fast bacteria.
　　　　a)　*Neisseria*　　　　　　　b)　*Staphylococci*
　　　　c)　*Mycobacterium*　　　　d)　*Corynebacterium*

　　9)　_____ is not considered as polymorph nuclear leukocytes.
　　　　a)　Eosinophils　　　　　　b)　Mast cell
　　　　c)　Macrophages　　　　　d)　Basophils

　　10)　In humans _____ antibody responsible for secondary immune
　　　　reaction.
　　　　a)　IgG　　　　　　　　　　b)　IgM
　　　　c)　IgA　　　　　　　　　　d)　IgE

B) Fill in the blanks 06

1) _____ contain chemicals such as histamine, heparin, cytokines, and growth factors.
2) _____ is the process by which the body produces blood cells and blood plasma.
3) Antibody secreted by _____ in response to an antigen.
4) Type I interferon is secreted by _____.
5) _____ is an example of bacterial cells that flourishes in a salty environment.
6) Gram stain, acid-fast stain and endospore stain are the examples of _____.

Q.2 Answer the following. 16
a) Write a note on Phagocytosis.
b) Write a note on Cryopreservation
c) Write a note on typical bacterial cell.
d) Write a note on methods used for detection of microbial diseases.

Q.3 Answer the following. 16
a) Describe principle and procedure of simple staining method.
b) Write down role and properties of Adjuvents with suitable examples.

Q.4 Answer the following. 16
a) Describe structure and function of IgG antibody.
b) Write a note on process and applications of Immuno electrophoresis.

Q.5 Answer the following. 16
a) Give a detailed account of Conjugation.
b) Describe in detail about the Adaptive Immunity.

Q.6 Answer the following. 16
a) Explain mechanism of Transduction.
b) Explain in detail cells & organs of Immune system.

Q.7 Answer the following. 16
a) Write in detail about the humoral immune response.
b) What is pure culture? Explain methods used for isolation of microorganisms.

M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Biochemistry and Biotechnology (MSC27206)

Day & Date: Tuesday, 25-07-2023   Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
                2) Attempt any three questions from Q. No. 3 to Q. No. 7
                3) Figure to right indicate full marks.

Q.1 A) Choose correct alternative. (MCQ)   **10**

1) Law of thermodynamics which states that energy can neither be created nor be destroyed is _____.
   a) The Second law of thermodynamics
   b) Third law of thermodynamics
   c) First law of thermodynamics
   d) Zero- order kinetics

2) _____ is the standard free energy change of ATP.
   a) Small and negative   b) Large and positive
   c) Large and negative   d) Small and positive

3) Amino acids with the aliphatic 'R' groups are _____.
   a) glycine, alanine, leucine
   b) Serine, threonine, cysteine
   c) Lysine, arginine, histidine
   d) Phenylalanine, tyrosine and tryptophan

4) The first amino acid of any polypeptide chain in eukaryotes is _____.
   a) Valine   b) Methionine
   c) Glycine   d) alanine

5) _____ most abundant biomolecule on the earth.
   a) Nucleic acids   b) Proteins
   c) Lipids   d) Carbohydrates

6) Glycogen in animals are stored in _____.
   a) Liver and spleen   b) Liver and muscles
   c) Liver and bile   d) Liver and adipose tissue

7) _____ is known as the Father of tissue culture.
   a) Bonner   b) Laibach
   c) Haberlandt   d) Gautheret

8) _____ is best method for checking mycoplasma contamination in a mammalian cell line.
   a) Southern Hybridization   b) ELISA
   c) PCR   d) Western Hybridization

9) _____ enzyme is used to cut DNA molecule in rDNA technology.
   a) Ligase   b) Phosphatase
   c) Ribonuclease   d) Restriction enzymes

10) The DNA segment to be cloned is called _____.
    a) Gene segment   b) DNA fragment
    c) DNA insert   d) RNA insert

B) **Write true/false.**   **06**
1) Gibb's free energy is the portion of the total energy which is available for useful work.
2) Histidine amino acid is not necessary to be taken in the diet.
3) $(CH_2O)^n$ is the general formula of carbohydrate.
4) Sodium chloride is used for the synthetic seed preparation.
5) Primary cell culture is type cell culture has a finite lifespan.
6) The gene formed by the joining of DNA segments from two different sources are called as chimeric gene.

Q.2 **Answer the following.**   **16**
  a) Brief out the laws of thermodynamics
  b) Write the difference between the allosteric and isoenzymes.
  c) Define Hormones and add aa note on its importance.
  d) Write short not pUC 18 vector.

Q.3 **Answer the following.**   **16**
  a) Explain in detail Single Cell Protein and Single Cell Oil.
  b) Illustrate the cellular metabolism and ATP energy sources in biological systems.

Q.4 **Answer the following.**   **16**
  a) Describe in detail the structure of proteins and add a note on importance of protein folding.
  b) Discuss the classification, basic structures, and functions of carbohydrates.

Q.5 **Answer the following.**   **16**
  a) Discuss different types of plant tissues culture media.
  b) Explain the application of somatic and germline gene therapy.

Q.6 **Answer the following.**   **16**
  a) Describe the classification and nomenclature of enzymes and its action of mechanism.
  b) Explain types of cell culture techniques used in animal cell culture.

Q.7 **Answer the following.**   **16**
  a) Write a note on the advantages and disadvantages of GMOs.
  b) Write a note on the concept of free energy and high energy compounds.

Seat No.	

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Biological Database Management System (MSC27301)

Day & Date: Monday, 10-07-2023   Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q.1 and Q.2 are compulsory.
2) Attempt any three questions from Q. No.3 to Q.No.7
3) Figures to right indicate full marks.

Q.1 A) Multiple Choice Questions.   **10**

1) DBMS stands for _____.
   a) Database Merge System
   b) Database Management System
   c) Database Management Section
   d) Developed Management System

2) WWW stands for _____.
   a) World Wide Web   b) World West Web
   c) World Working Web   d) Watch Wide Web

3) The operation of eliminating columns in a table done by _____ operation.
   a) Restrict   b) Project
   c) Union   d) Divide

4) A functional dependency is a relationship between or among _____.
   a) Tables   b) rows
   c) relations   d) attributes

5) Oracle manages the storage space in the data files of a database in units called _____.
   a) data blocks   b) file manager
   c) memory   d) dictionary

6) SGA stands for _____.
   a) System Global Application b) Security Global Area
   c) System Global Area   d) Serial Group Area

7) _____ is the set of values of the same data type.
   a) Summary   b) Domain
   c) Variable   d) Float

8) Every row of a relation is called as _____.
   a) model   b) tuple
   c) rank   d) Stub

9) Operations which take two relations as input are _____ operations.
   a) Unary
   b) Tertiary
   c) Sum
   d) Binary

10) KNIME stands for _____.
   a) Korus Information Miner
   b) Konstanz Introduction Miner
   c) Konstanz Information Miner
   d) Konstanz Information Majority

B) **Fill in the blanks.** 06
1) URL stands for _____.
2) Relational model introduced by _____.
3) All attributes in a relation are _____.
4) The total number of tuples at any one time in a relation is known as the table's _____.
5) Network model supports _____ relationships.
6) Parents and children are tied together by links called _____.

Q.2 **Answer the followings.** 16
   a) Describe in detail Structures in Oracle.
   b) Define 'entity integrity' also explain its type.
   c) Write types programming Languages with examples.
   d) Write structure of SQL and explain its data types.

Q.3 **Answer the followings.** 16
   a) Write brief account on DBMS Architecture.
   b) Explain in detail data model and its types.

Q.4 **Answer the followings.** 16
   a) Write brief account on RDBMS Applications in Bioinformatics
   b) Describe in detail DBMS.

Q.5 **Answer the followings.** 16
   a) Explain in detail MATLAB image processing and its applications.
   b) Write and explain database development and management.

Q.6 **Answer the followings.** 16
   a) Write history of RDBMS.
   b) Write brief account on PL-SQL.

Q.7 **Answer the followings.** 16
   a) Write and explain Actors on the scene and Workers behind the scene.
   b) Write short note on Data Mining.

Set No.		Set	P

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Computational Structure Biology and Drug designing (MSC27306)

Day & Date: Wednesday, 12-07-2023   Max. Marks: 80
Time: 11:00 AM To 02:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
                2) Attempt any three questions from Q. No. 3 to Q. No. 7
                3) Figure to right indicate full marks.

Q.1 A) Choose the correct alternative.   **10**

1) _____ is a structure found at both terminal arms of protein structure.
   a) Alpha helix   b) Beta sheet
   c) Loop   d) Random coils

2) Phi and Psi angles are present in _____.
   a) DNA   b) Carbohydrates
   c) Proteins   d) Lipids

3) Rampage is used to check the model quality of _____.
   a) DNA   b) Proteins
   c) Lipid   d) carbohydrate

4) _____ file format is a chemical structure data file.
   a) .pdf   b) .pdb
   c) .mol2   d) .sdf

5) TMHMM is used to predict _____.
   a) DNA helix   b) transmembrane helices
   c) topology in DNA   d) Motifs in proteins

6) Biocarta is _____ database.
   a) Lipids   b) Pathway
   c) RNA   d) Drug

7) _____ is *in silico* server used to identify the protein-protein interaction.
   a) DIP   b) Biacore
   c) x-ray   d) Y2H

8) Number of hydrogen bond acceptors in a drug should be _____.
   a) < 5 b) < 10
   c) > 12 d) > 5

9) Protein Data Bank (PDB) has a unique accession or identification code. These codes are always _____ characters in length.
   a) 2   b) 3
   c) 4   d) 5

10) Query sequence identity _____% to template is selected to build 3D structure.
   a) < 20 b) < 10
   c) > 30 d) < 15

B) **Fill in the blanks.** 06

1) "KEGG" is a _____ database.
2) The anti-parallel beta sheets are _____ structure.
3) Lectins are_____.
4) Therapeutic trials are carried out in _____ phase of clinical trials.
5) Modeler is a _____ tool.
6) FDA approves _____.

Q.2 **Answer the following.** 16

a) Write a note on protein-DNA interaction.
b) Describe in detail about PDBe Resource.
c) Explain in detail Neural network method.
d) Write a note on protein folding classes.

Q.3 **Answer the following.**

a) Explain the structure based and ligand-based drug design. 10
b) Write a note on RNA structure prediction methods. 06

Q.4 **Answer the following.**

a) Explain Lipinski's rule of five in details and mention its significance. 10
b) Describe the Pharmacophore modeling in detail. 06

Q.5 **Answer the following.**

a) Describe the drug metabolism phases and add a note on drug metabolizing enzymes. 10
b) Write a note on prodrug. Add a note on drug absorption mechanism. 06

Q.6 **Answer the following.**

a) What is Virtual Screening? Explain the pharmacokinetics properties in drug design. 10
b) What are torsion angles? Explain Ramchandran plot analysis in detail. 06

Q.7 **Answer the following.**

a) Explain the structure based and ligand-based drug design. 10
b) Describe molecular docking tool AUTODOCK in detail. 06

Set No.		Set	**P**

M.Sc. (Semester - IV) (New) (CBCS)Examination: March/April-2023
BIOINFORMATICS
Biological Simulation and Modeling (MSC27401)

Day & Date: Monday, 10-07-2023   Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and. 2 are compulsory.
           2) Attempt any three questions from Q. No. 3 to Q. No. 7
           3) Figure to right indicate full marks.

Q.1 A) Choose the correct alternative.   **10**

1) A _____ is a block of organized, reusable code that is used to perform a single, related action.
   a) function   b) operator
   c) array   d) scalar

2) A _____ statement allows us to execute a statement or group of statements multiple times.
   a) constructor   b) loop
   c) variable   d) method

3) Python is a _____ typed language.
   a) class   b) object
   c) static   d) dynamically

4) Python supports _____ applications.
   a) CGI   b) GUI
   c) cmd   d) advanced

5) _____ is used in python to delimit blocks.
   a) Semicolon   b) Dictionary
   c) Indentation   d) Comma

6) Dynamics simulations are performed using _____.
   a) microphone   b) laptops
   c) super computer   d) desktop

7) The molecular interaction is usually _____ of molecules.
   a) moving   b) binding
   c) overlapping   d) repelling

8) The energy associated with a stable conformer is always _____.
   a) High   b) Low
   c) medium   d) Average

9) The energy scores for molecular docking are expressed as _____.
   a) positive   b) neutral
   c) negative   d) bipolar

10) Proteins in molecular mechanics are studied best with respect to their ____.
   a) structure   b) function
   c) location   d) energy

B) Fill in the blanks. 06
1) _____ developed Python Programming Language.
2) Extension of the Python files is _____.
3) WWW stands for _____.
4) Population model is a type of _____ model.
5) The first step of simulation is _____.
6) The first organism studied by molecular dynamics is _____.

Q.2 Answer the following. 16
a) Write any four features of python and explain it detail.
b) Write a note on Python Interpreter.
c) Add a note on bacterial model in simulation.
d) Write a note on applications of molecular mechanics.

Q.3 Answer the following. 16
a) Explain a detail account on Python modules.
b) Explain python program organization and its functions in detail.

Q.4 Answer the following. 16
a) List out bio-python tools with its applications.
b) Write a note on History of python and versions in detail.

Q.5 Answer the following. 16
a) Explain a detail account on Python classes and objects.
b) Write a note on principle and applications of simulations.

Q.6 Answer the following. 16
a) Write a note on geometry optimization with applications.
b) Explain the importance of molecular modeling in simulations.

Q.7 Answer the following.
a) Define conformation. Add a note on conformational search. 16
b) Add a note on molecular dynamics with examples.

Set No.		Set	P

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Clinical Bioinformatics (MSC27402)

Day & Date: Wednesday, 12-07-2023   Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and. 2 are compulsory.
              2) Attempt any three questions from Q. No. 3 to Q. No. 7
              3) Figure to right indicate full marks.

Q.1 A) Choose the correct alternative.   **10**

1) An _____ system that groups related disease entities and conditions for the purpose of reporting statistical information.
   a) ICD   b) IDC
   c) ISD   d) DSI

2) Quality ____(QC) is a process by which entities review the quality of all factors involved in production.
   a) central   b) corporation
   c) control   d) community

3) ____ reaction, a process in which one or more substances, the reactants, are converted to one or more different substances, the products.
   a) Biological   b) Physical
   c) Chemical   d) Ecological

4) ____ is the science & activities relating to the detection, assessment, understanding and prevention of adverse effects.
   a) AV   b) TV
   c) NV   d) PV

5) Genome _____ refers to the amount of DNA contained in a haploid genome expressed either in terms of the number of base pairs.
   a) Same   b) Similarity
   c) Size   d) colour

6) Ensemble genome database project is a scientific project at the European _____ Institute, which was launched in 1999 in response to the imminent completion of the Human Genome Project.
   a) Basics   b) Biomedical
   c) Biology   d) Bioinformatics

7) The mouse genome is _____ billion DNA letters long, about 14 percent shorter than the human genome, which is 2.9 billion letters long.
   a) 1.6   b) 1.8
   c) 6.8   d) 2.5

8) The   Path DB Bioinformatics Resource Center provides a portal for accessing genomic-scale datasets associated with the diverse eukaryotic microbes.
   a) Pu   b) Tb
   c) Kb   d) Eu

9) A viral _____ detection test is done on a sample of tissue that might be infected.
   a) antibody   b) asthma
   c) allergen   d) antigen

10) Alzheimer's disease (AD) is a chronic _____ disease that results in the loss of neurons and synapses in the cerebral cortex and certain subcortical structures.
    a) pvd   b) Neurodegenerative
    c) cvd   d) cf

B) Write true / false.   **06**
   1) R is private and commercial software as it is not licensed under the terms of the GNU General Public License.
   2) DNA methylation is the process by which a acidic group is added to DNA.
   3) The main function of pathology informatics is standardized and coded machine consumable data.
   4) Pharmacovigilance is also called as drug safety.
   5) The most prevalent drug-metabolizing enzymes (DME) are the Cytochrome P450 (CYP) enzymes.
   6) The National Center for Biotechnology Information is maintained by Swiss institute of bioinformatics.

Q.2 Answer the following.   **16**
   a) Write a note on types of clinical research?
   b) Give a note on A.thaliana genome sequence project and applications.
   c) What are the symptoms of viral diseases?
   d) How pharmcogenomics necessary for drug designing?

Q.3 Answer the following.
   a) Write in detail of Next generation sequencing platforms?   **08**
   b) Explain the clinical data management and its available software.   **08**

Q.4 Answer the following.
   a) Give a detailed account on Ensemble and Map viewer database.   **08**
   b) Give a detailed account on Pathology informatics and tools for analysis of pathology informatics. **08**

Q.5 Answer the following.
   a) What is circulatory disease and available treatment for circulatory disease? **08**
   b) Give a detailed note on metabolomics and its applications?   **08**

Q.6 Answer the following.
   a) Explain the genome assembly and types of genome assembly in detail.   **10**
   b) What is medical coding and steps of medical coding?   **06**

Q.7 Answer the following.
   a) Explain Host Pathogen interactions and give the details of database for host pathogen interactions. **10**
   b) Write a note on Human Genome project and its ELSI in implications on human disease. **06**

Seat No.

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023
Bioinformatics
Research Methodology and IPR in Bioinformatics (MSC27403)

Day & Date: Friday, 14-07-2023   Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Question no. 1 and 2 are compulsory.
                2) Attempt any three questions from Q. No. 3 to Q. No. 7.
                3) Figure to right indicate full marks.

Q.1 A) Multiple choice questions.   **10**

1) _____ is the first step of Research process.
   a) Formulation of a problem   b) Editing and Coding
   c) Collection of Data   d) Selection of a problem

2) Converting a question into a Researchable problem is called_____.
   a) Solution   b) Examination
   c) Problem formulation   d) Problem Solving

3) The problem selected must have_____.
   a) Speed   b) Facts
   c) Values   d) Novelty

4) A comprehensive full Report of the research process is called_____.
   a) Thesis   b) Summary Report
   c) Abstract   d) Article

5) A Blue print of Research work is called_____.
   a) Research Problem   b) Research design
   c) Research tools   d) Research methods

6) _____ may be defined as the logical and systematic arrangement of statistical data in rows and columns.
   a) Tabulation   b) Presentation
   c) Graph   d) Structure

7) The square of the standard deviation is the_____.
   a) Mode   b) Variance
   c) Median   d) Series

8) A new way to process milk so that there is no fat in any cheese made from, it is covered under_____.
   a) Copy rights   b) Trade mark
   c) Patent   d) Industrial designs

9) _____ of the following is not an intellectual property law.
   a) Copyright Act, 1957   b) Patent Act, 1970
   c) Trademark Act, 1999   d) Customs Act, 1962

10) PBR can be granted only to_____ of a new variety.
   a) breeder or owner   b) buyer or seller
   c) buyer or transporter   d) seller

B) Write true or false. 06
   1) Research is not a continuous process.
   2) The conclusions chapter is really just a summary of the whole report.
   3) When the null hypothesis is found to be true, the alternative hypothesis must also be true.
   4) Trade secrets are protected by intellectual property rights.
   5) DUS testing is done for distinctness, uniformity, stability of plant variety
   6) A trade secret is any practice or process of a company that is generally not known outside of the company.

Q.2 Answer the following. 16
   a) Write note on selection of research problem.
   b) What is analysis of variance? Explain types of ANOVA?
   c) Explain the detail the literature review.
   d) What is plagiarism? Add a note on types of Plagiarism.

Q.3 Answer the following.
   a) Explain the conditions for obtaining protection for new plant variety. 08
   b) Explain the methods of technology transfer. 08

Q.4 Answer the following.
   a) Describe in detail about copy rights. 08
   b) Discuss in detail the patent case study with respect to Neem and Turmeric. 08

Q.5 Answer the following.
   a) Explain in detail the oral and poster presentation. 08
   b) Explain in detail the guidelines for writing a Bibliography. 08

Q.6 Answer the following.
   a) What is data? Describe in detail the primary data collection methods. 08
   b) What are degrees of freedom? Explain Chi-square test with example. 08

Q.7 Answer the following.
   a) What is hypothesis? Explain how hypothesis helps in the scientific method. 08
   b) What is the importance of research? Explain in detail the types of research? 08

Seat No.		**Set**	**P**

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2023
BIOINFORMATICS
Emerging Areas of Bioinformatics (MSC27406)

Day & Date: Sunday, 16-07-2023　　　　　　　　　　　　Max. Marks: 80
Time: 03:00 PM To 06:00 PM

Instructions: 1) Q. Nos. 1 and 2 are compulsory.
　　　　　　　2) Attempt any Three questions from Q.No.3 to Q.No.7.
　　　　　　　3) Figures to the right indicate full marks.

Q.1　A)　Choose the correct alternatives from the options.　　　　10

1) ChEMBLdb is a manually curated chemical database of bioactive molecules with drug-like properties and it is maintained by the _____.
   a) EBI　　　　　　　　　　b) NCBI
   c) Expasy　　　　　　　　d) Chembank

2) Antigen information is stored by _____ cells.
   a) plasma　　　　　　　　b) dendritic
   c) APC　　　　　　　　　d) memory

3) The term "_____ taxonomy" is primarily used today to refer to the discipline of finding, describing, and naming taxa, particularly species.
   a) Alpha　　　　　　　　b) Beta
   c) Gamma　　　　　　　d) Delta

4) The use of computer and resources for the biological study is termed as _____.
   a) In-vivo　　　　　　　b) In-vitro
   c) Ex-vivo　　　　　　　d) In-silico

5) The term _____ was defined in its application to drug discovery, for instance, by F.K. Brown in1998.
   a) Chemoinformatics　　b) Biodiversity
   c) Biology　　　　　　　d) Computer

6) In human the MHC molecules are called as _____.
   a) HINI　　　　　　　　b) H2B
   c) HEPA　　　　　　　　d) HLA

7) The hot spots areas have _____ density of biodiversity.
   a) Low　　　　　　　　　b) Medium
   c) Initial　　　　　　　d) High

8) In pharmacology, a _____ is a chemical substance, typically of known structure, which, when Administered to a living organism, produces a biological effect.
   a) Data
   b) distribution
   c) Drug
   d) Disease

9) Biological synthesis of nanoparticle using plant is also called as _____.
   a) white synthesis
   b) red synthesis
   c) green synthesis
   d) black synthesis

10) Missense _____ change in the base results in change in amino acid of protein and its malfunction which leads to disease.
    a) Multiple
    b) Haplotype
    c) Phenotype
    d) Single

B) Write true or false. 06
1) ChemAxon Products include tools for visualization and drawing of molecules, chemical database searching and management, and for drug discovery.
2) Polyphen is a offline tool for prediction the mutation in SNP analysis.
3) Genetic diversity describes the variation in the number and types of genes as well as chromosomes present in different species.
4) Molecular docking is a method which predicts the preferred orientation of one molecule to a second when bound to each other to form a stable complex.
5) Paratome database is used for the prediction of epitopes.
6) Quantum dots are largest nano particles.

Q.2 Answer the following. 16
a) Explain the MDL Mol file format in detail.
b) Write a note of dbSNP database and submission details.
c) Write a note on types of Biodiversity.
d) Write a note on application of informatics in immunology.

Q.3 Answer the following.
a) Write Pubchem and Drug bank chemical database in detail. 08
b) Give a detail account Substructure based searching. 08

Q.4 Answer the following.
a) Define Chemoinformatics and how to take perform virtual screening in drug designing. 08
b) Define Epitope. Add a note on databases and tools for its prediction. 08

Q.5 **Answer the following.**
a) Write a detail account molecular phylogenetics and its molecular data types. **08**
b) Define nanoinformatics. Add a note on types of nanoparticles with applications. **08**

Q.6 **Answer the following.**
a) Give a detailed account Botanical Library BRIT and BGBM database with its standards. **10**
b) What is immunoinformatics? Add a note on databases of it. **06**

Q.7 **Answer the following.**
a) Write in detail Species2000 and TDWG database with its standard and protocols. **10**
b) Explain the single nucleotide polymorphism with applications in personalized medicine. **06**