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No.

**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov-2022
(BIOINFORMATICS)
Basic Bioinformatics**

Day & Date: Monday, 13-02-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- 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) Fill in the blanks by choosing correct alternatives. 10

- 1) ENA database is get updated on _____ basis.
 - a) Daily
 - b) Weekly
 - c) Monthly
 - d) every two months
- 2) _____ database is used to search homologous sequences from the databases.
 - a) BLAST
 - b) BLOCK
 - c) Swiss-Prot
 - d) ENTREZ
- 3) Support Vector Machine is a _____ learning algorithms.
 - a) Supervised
 - b) Unsupervised
 - c) Clustering
 - d) Density
- 4) _____ term is used when the DNA, RNA, or protein sequences, shared ancestry in the evolutionary history of life.
 - a) Orthologous
 - b) Ancestor
 - c) Homology
 - d) Paralogous
- 5) _____ database is used to characterize a protein family.
 - a) TrEMBL
 - b) PRINTS
 - c) PIR
 - d) NRL- 3D,
- 6) _____ a tree in which a special ("labeled") node is singled out.
 - a) Unrooted tree
 - b) Rooted tree
 - c) guide tree
 - d) dendrogram tree
- 7) _____ algorithm is used by local alignment.
 - a) Needleman and Wunsch
 - b) Smith-Waterman
 - c) BLAST
 - d) PAM
- 8) _____ database is a microarray gene expression database studying in bioinformatics.
 - a) SWISS-PROT
 - b) GEO
 - c) DDBJ
 - d) EST
- 9) BLAST algorithm used for sequence analysis of proteins and nucleotides was developed by _____.
 - a) Margaret Dayhoff
 - b) Paulin Hogeweg
 - c) David Lipman
 - d) Stephen Altschul
- 10) UPGMA is _____ based method for phylogenetic tree construction.
 - a) Distance
 - b) Character
 - c) Number
 - d) tool

- B) Fill in the blanks.** **06**
- 1) _____ is a genome browser for vertebrate genomes.
 - 2) _____ is one of the FASTA variant which compares a protein query to a DNA database.
 - 3) _____ Database was collaboratively by the department of medical biochemistry at the University of Geneva and the EMBL.
 - 4) Mention 3 neural networks types _____.
 - 5) _____ a Unique constant code given to each sequence in ENA database Synthetic.
 - 6) Sequences and patented sequences are deposited in _____ databases.

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

- a) Write a note on methods of Phylogenetic tree construction.
- b) Write a note on different neural network.
- c) Explain in detail about scoring matrices.
- d) Describe different BLAST variants.

Q.3 Answer the following. **16**

- a) Explain the PIR, MIPS and SWISS-PROT database.
- b) Explain GenBank Sequence file format in detail.

Q.4 Answer the following. **16**

- a) Explain PIR, MIPS, SWISS-PROT.
- b) Describe Phylogenetic software MEGA.

Q.5 Answer the following. **16**

- a) Explain Genome database in detail with its applications.
- b) Write a note on application of HMM in sequence and structure analysis.

Q.6 Answer the following. **16**

- a) Explain Types of Phylogenetics tree.
- b) Explain internet and its role in bioinformatics.

Q.7 Answer the following. **16**

- a) Explain dot plot and dynamic programming or sequence analysis.
- b) Write a note on elements of phylogeny.

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**M.Sc. (Semester - I) (New) (CBCS) Examination: Oct/Nov - 2022
(BIOINFORMATICS)
Cell Biology and Genetics**

Day & Date: Tuesday, 14-02-2023
Time: 03:00 PM To 06:00 PM

Max. Marks: 80

- Instructions:** 1) Question No. 1 and 2 are compulsory.
2) Attempt any 3 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) The word "karyon" refers to _____.
a) Cytoplasm b) Nucleus
c) Chloroplast d) Mitochondria
- 2) _____ is an example of autotrophic cell.
a) Plant cell b) Bacteria
c) Animal cell d) Virus
- 3) _____ is considered as semi-autonomous cell organelle.
a) Ribosome b) Golgi complex
c) Mitochondria d) Cell membrane
- 4) DNA replication carried out in _____ phase of cell cycle.
a) G₁ b) S
c) G₂ d) G₀
- 5) The genotype ratio of F₂ generation in typical monohybrid cross is _____.
a) 1:2:1 b) 2:2
c) 3:1 d) 1:1
- 6) Histone proteins are found associated with genome of _____ cell.
a) Animal b) Bacteria
c) Virus d) Protozoa
- 7) The most abundant type of RNA is _____.
a) tRNA b) mRNA
c) rRNA d) ssRNA
- 8) The coding regions of DNA are called _____.
a) Introns b) Exons
c) Repetitive DNA d) Replicon

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- 9) Jacob and Monod discovered Operon model of regulation of gene expression in _____.
- a) Bacteria
 - b) Plants
 - c) Animals
 - d) Virus
- 10) _____ is known as linker histone protein.
- a) H1
 - b) H2A
 - c) H2B
 - d) H4

B) True / False

06

- 1) A heterotroph is an organism that cannot produce its own food.
- 2) The membrane surrounding the vacuole is known as tonoplast.
- 3) Ion channels allowing the passage of ions across the membrane.
- 4) The nuclear pores regulate the transportation of molecules between the nucleus and the cytoplasm.
- 5) An intron is any nucleotide sequence within a gene that is not expressed or operative in the final RNA product.
- 6) Replicon is structural and functional unit of DNA replication.

Q.2 Answer the followings.

16

- a) Describe structure of nucleus with neat labeled diagram.
- b) Describe structure of different types of RNA.
- c) Explain structure of ribosome with neat labeled diagram.
- d) Give properties of genetic code.

Q.3 Answer the followings.

16

- a) Add a note on prokaryotic cell with diagram.
- b) Give an account on types of membrane transport.

Q.4 Answer the followings.

16

- a) Explain in detail process of apoptosis.
- b) What is fluid mosaic model?

Q.5 Answer the followings.

16

- a) Write a short note on Mendel's laws of inheritance.
- b) Write a note on Eukaryotic genome organization.

Q.6 Answer the followings.

16

- a) Describe rolling circle model of DNA replication.
- b) Add a note on types of mutations.

Q.7 Answer the followings.

16

- a) Write a note on post translational modifications.
- b) Describe regulation of Lactose operon with neat diagram.

- 10) _____ of the following doesn't support the MP3 format.
- | | |
|-----------|------------|
| a) Opera | b) Safari |
| c) Chrome | d) Firefox |

B) Fill in the blanks OR Write True/False 06

- 1) Any representative part of the population is known as _____.
- 2) Hypothesis which specifies the population completely is known as ____.
- 3) Square of Standard normal variate is _____.
- 4) The technique ANOVA was developed by _____.
- 5) In HTML the <hr> tag is used for _____.
- 6) The average which is useful for measuring relative growth of population is _____.

Q.2 Answer the following. 16

- a) What is the use of span tag? Give example.
- b) Write a note on difference between XML and HTML.
- c) What is Marquee?
- d) Distinguish between census and sample method.

Q.3 Answer the following. 10

- a) What is the difference between HTML elements and tags? Explain 10
- b) Describe the test for significance of population correlation coefficient. 6

Q.4 Answer the following. 10

- a) Define student t test. Write a note on its application. 10
- b) How to create nested webpage in HTML. 6

Q.5 Answer the following. 10

- a) Distinguish between nominal and ordinal scales with examples. 10
- b) What are HTML entities? 6

Q.6 Answer the following. 10

- a) Describe HTML layout structure. 10
- b) Distinguish between nominal and ordinal data with example. 6

Q.7 Answer the following. 10

- a) What are various formatting tags in HTML? 10
- b) Write a note on application and scope of Biostatistics. 6

- B) Fill in the blanks.** **06**
- 1) URL stands for _____.
 - 2) The _____ is used to terminate a statement.
 - 3) C has _____ keywords but number of built in functions.
 - 4) In CPP, members of a class are _____ by default.
 - 5) C language has been designed and written by _____.
 - 6) _____ is a set of logical procedure steps to solve the problem.
- Q.2 Answer the following.** **16**
- a) Describe in detail Dynamic programming.
 - b) Explain in detail levels of Programming.
 - c) Write a short note on C programming.
 - d) Write structure of c++ and explain its data types.
- Q.3 Answer the following.** **16**
- a) Describe in detail Decision control statements in C++.
 - b) Write brief account on "History of C".
- Q.4 Answer the following.** **16**
- a) Write Short note on "Operators in C++".
 - b) Describe in detail OOP language.
- Q.5 Answer the following.** **16**
- a) Give write note on "fundamental of computer"
 - b) Write program on templates in C++.
- Q.6 Answer the following.** **16**
- a) Write brief account on Operating system.
 - b) Describe in detail account on Pointers in C.
- Q.7 Answer the following.** **16**
- a) Describe in detail file handling process.
 - b) Write program on array and explain its types.

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**M.Sc. (Semester - III) (New) (CBCS) Examination: Oct/Nov-2022
(BIOINFORMATICS)**

Computational Structure Biology and Drug designing

Day & Date: Wednesday, 15-02-2023
Time: 11:00 AM To 02:00 PM

Max. Marks: 80

- 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. (MCQ)

10

- 1) _____ is used for the detection of protein-protein interaction.
 - a) Native PAGE
 - b) Y2H
 - c) Spectrophotometer
 - d) Coimmunoprecipitation
- 2) _____ should be the quality of 3D modeled proteins.
 - a) >90%
 - b) >30%
 - c) <90%
 - d) <30%
- 3) _____ is not a drug metabolizing enzyme.
 - a) CYP2C8
 - b) CYP2C19
 - c) CYPA1
 - d) Reductase
- 4) Clinical trials are carried on _____.
 - a) Animals
 - b) Human's
 - c) Birds
 - d) Reptiles
- 5) Relationships between chemical structure and biological activity in a quantitative manner can be predicted by _____.
 - a) QSAR
 - b) QSBR
 - c) QSTR
 - d) QSPR
- 6) _____ is not a type of protein secondary structure.
 - a) Alpa helix
 - b) beta sheet
 - c) Loop
 - d) Folds
- 7) _____ is a 3D protein structure prediction tool.
 - a) RamPage
 - b) Modeller
 - c) Protospred
 - d) 3DPred
- 8) Protein model quality is checked using _____ server.
 - a) PDBeMotiff
 - b) PDBeNMR
 - c) PDBSum
 - d) PDBeFold
- 9) _____ are text files which contain structure information for single molecular compounds.
 - a) .pdf
 - b) .pdb
 - c) .mol2
 - d) .SDF
- 10) _____ is a transmembrane helices prediction tool.
 - a) Memtool
 - b) Membranetool
 - c) TMHMM
 - d) HTool

- B) Fill in the blanks.** **06**
- 1) The AD and BD transcription activator binds to _____ region of DNA.
 - 2) GOR method is used to predict _____ structure.
 - 3) DNase footprinting assay is used to detect _____ interaction.
 - 4) Testing drugs on animals is called _____ trial.
 - 5) RasMol is _____ tool.
 - 6) HEX software is used for _____.
- Q.2 Answer the following.** **16**
- a) Write a note on position specific scoring matrices.
 - b) Describe Human Pathway Database.
 - c) Explain in architectures and topologies of protein and DNA.
 - d) Explain Metalloproteins with examples.
- Q.3 Answer the following.**
- a) Explain the computer aided drug design. (CADD) **10**
 - b) Explain the DNA-Drug interaction. **06**
- Q.4 Answer the following.**
- a) Explain pharmacokinetics properties. **10**
 - b) Describe the clinical trials in detail. **06**
- Q.5 Answer the following.**
- a) Explain the types of secondary structure in protein. **10**
 - b) Describe RCSB-PDB database in detail. **06**
- Q.6 Answer the following.**
- a) What is drug absorption? Write a note on mechanisms and factor affecting drug absorption. **10**
 - b) What is Y2H system? Explain protein-protein interaction detection using Y2H. **06**
- Q.7 Answer the following.**
- a) Explain the steps involved in Homology based modeling. **10**
 - b) Describe combinatorial chemistry with its applications. **06**

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Set **P**

**M.Sc. (Semester - IV) (New) (CBCS) Examination: Oct/Nov-2022
(BIOINFORMATICS)
Clinical Bioinformatics**

Day & Date: Tuesday, 21-02-2023

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) 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) Ensembl 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

Q.4 Answer the following.

- a) Give a detailed account on Ensembl and Mapviewer 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**

- 9) The size of nanoparticles ranges from _____.
- a) 1-1000cm b) 1-1000mm
c) 1-1000um d) 1-1000nm
- 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

- Q.1 B) Write True/False. 06**
- 1) PubChem is a database of chemical molecules and their activities against biological assays. The system is maintained by EBI.
 - 2) dbSNP is database maintained by European molecular biology laboratory.
 - 3) Species 2000 is a federation of database organizations across the world that compiles the Catalogue of Life.
 - 4) Polyphen is a offline tool for prediction the mutation in SNP analysis.
 - 5) Epitome database is used for the prediction of epitopes.
 - 6) The size of nanoparticles is measured in micrometers.
- Q.2 Answer the following. 16**
- a) Explain the SDF file format in detail.
 - b) Write a note of dbSNP database and submission details.
 - c) Write a note on Molecular data types in Molecular phylogenetics.
 - d) Write a note on importance of immunoinformatics.
- Q.3 Answer the following. 16**
- a) Write Pubchem and Drug bank chemical database in detail.
 - b) Give a detail account Substructure based searching.
- Q.4 Answer the following. 16**
- a) What is polymorphism and how to take clinical decision for personalized medicine?
 - b) Define IMGT. Add a note on its databases.
- Q.5 Answer the following. 16**
- a) Write a detail account on TDWG and its standards and protocols.
 - b) Add a note on methods of synthesis of nanoparticles.
- Q.6 Answer the following. 10**
- a) Give a detail account on Chemoinformatics and application of chemoinformatics in different field? 10
 - b) Write a detailed note on applications of immunoinformatics. 06
- Q.7 Answer the following. 10**
- a) Give a detailed account Botanical Library BRIT and BGBM database with its standards? 10
 - b) Explain the Genetic testing with applications in personalized medicine? 06

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**M.Sc. (Semester - IV) (Old) (CBCS) Examination: Oct/Nov-2022
(BIOINFORMATICS)**

Biological Simulation and Modeling

Day & Date: Monday, 20-02-2023

Max. Marks: 80

Time: 03:00 PM To 06:00 PM

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

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

- 1) Python was developed by _____.
a) Stave Jobs b) Dennis Ritchi
c) Guido van Rossum d) Larry Wall
- 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) Inverse Development Environment
- 4) _____ is a sequence of text characters in a program.
a) Code b) String
c) Program d) Data types
- 5) Python was released publicly in _____.
a) 1941 b) 1971
c) 1981 d) 1991
- 6) An event is arranged as function of _____.
a) energy b) Time
c) temperature d) Pressure
- 7) Simulations are performed because the events are not _____.
a) calculated b) visualized
c) estimated d) tabulated
- 8) Molecular simulations represent _____ of biomolecules.
a) shape b) mass
c) interaction d) size

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- 9) Epidemic model is used to study _____ in simulations.
a) growth b) bacteria
c) parameters d) disease
- 10) Geometry optimization is a process of lowering _____.
a) pressure b) force
c) temperature d) energy

Q.1 B) Fill in the blanks. 06

- 1) Python supports _____ applications.
- 2) A _____ statement allows us to execute a statement or group of statements multiple times.
- 3) URL stands for _____.
- 4) Simulation is mimicking of _____.
- 5) The energy of stable molecule is always _____.
- 6) Molecular dynamics refers to _____ of molecules.

Q.2 Answer the following. 16

- a) Explain a detail account on Python file handling.
- b) Write a note on Python Indentation.
- c) Add a note on applications of simulations.
- d) Write a note on energy types in molecular mechanics.

Q.3 Answer the following. 16

- a) Explain python data types in detail.
- b) Write features of python? Explain features in detail.

Q.4 Answer the following. 16

- a) List out python tools with its applications.
- b) Explain a detail account on Python object oriented.

Q.5 Answer the following. 16

- a) Explain python list and its functions in detail.
- b) Define simulation. Add a note on basic principles.

Q.6 Answer the following. 16

- a) Explain biological models of simulations.
- b) Write a note on energy minimization in simulations.

Q.7 Answer the following. 16

- a) Write a note on conformational search in simulations.
- b) Add a note on molecular dynamics with applications.

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Set **P**

**M.Sc. (Semester - IV) (Old) (CBCS) Examination: Oct/Nov-2022
(BIOINFORMATICS)
Clinical Bioinformatics**

Day & Date: Tuesday, 21-02-2023

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

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 - 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.
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 - 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.
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 - b) similarity
 - c) size
 - d) colour
- 6) Ensembl 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.
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 - b) Biomedical
 - c) Biology
 - d) Bioinformatics

Q.4 Answer the following.

- a) Give a detailed account on Ensembl and Mapviewer 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**

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**M.Sc. (Semester - IV) (Old) (CBCS) Examination: Oct/Nov-2022
(BIOINFORMATICS)**

Research Methodology and IPR In Bioinformatics

Day & Date: Wednesday, 22-02-2023

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) The first step in formulating a problem is _____.
 - a) Statement of the problem
 - b) Gathering of Data
 - c) Measurement
 - d) Survey
- 2) _____ is a quality of Good Researcher.
 - a) Scientific temper b) Age
 - c) Money d) Time
- 3) _____ part of a research report contains details description of experiment was planned and conducted.
 - a) Results b) Design
 - c) Introduction d) Method
- 4) When referencing other works you have cited within the text of the report you should _____.
 - a) State the first and last name of the author
 - b) Use the author, date citation method
 - c) Use an asterisk and a footnote
 - d) Insert the complete citation in parenthesis
- 5) Sampling theory helps us to estimate _____ population.
 - a) Unknown b) Known
 - c) Particular d) Universal
- 6) _____ is not a method of data collection.
 - a) Questionnaires b) Interviews
 - c) Experiments d) Observations
- 7) _____ of these is a geographical indication.
 - a) BMW b) Mysore silk
 - c) Hogwarts d) Play station

- Q.5 Answer the following.** **16**
- a) Write a note on ISSN and ISBN.
 - b) Explain the guidelines for writing the materials and methods section of thesis.
- Q.6 Answer the following.** **16**
- a) Write a note on patent search databases.
 - b) Discuss in detail the patent case study with respect to Neem and Turmeric.
- Q.7 Answer the following.** **16**
- a) Write a note on technology transfer process.
 - b) Explain the requirements of material for DUS testing.