SLR-HC-6

Set No.	

Set P

M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Advanced Bioinformatics (MSC27201)

Day & Date: Thursday, 09-05-2024 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) PSSM stands for _____
   a) position searching scoring matrices
   b) position specific scoring matrices
   c) protein specific scoring matrices
   d) protein specific searching matrices

2) _____ is a chain-like biological structure made up of connectivity between secondary structural pieces.
   a) Domain b) Motif
   c) Coils d) Loops

3) _____ describes a motif using a qualitative consensus sequence.
   a) Beta sheet b) Pattern
   c) Profile d) Alpha helix

4) PAM was discovered in 1966 by _____.
   a) Henikoff b) Margaret Dayhoff
   c) David lipman d) Pauling colin

5) _____ is a free public archive for genetic variation within and across different species developed and hosted by the NCBI.
   a) Uniprot b) OMIM
   c) SAGE d) SNP

6) _____ microarray is a collection of microscopic DNA spots attached to a solid surface.
   a) DNA b) Protein
   c) Oligomeric d) Lipid

7) _____ is not a microarray data analysis tool.
   a) BASE b) BART
   c) ArrayTrack d) ArrayGene

8) _____ is a structure visualization tool.
   a) PiMol b) PyMol
   c) RoseMol d) Gmol

9) _____ an is a spiral-like structure with 3.6 amino acid residues per turn.
   a) α-helix b) β-sheets
   c) Coils d) Random coils

10) _____ is a molecular model validation tool.
a) Protein check b) PROCHECK
c) Dcheck d) Wifi3D

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

1) _____ secondary structure predication tool.
2) Instability index less than _____ number predicts a stable protein.
3) Modeller is ____ tool.
4) _____ is an open-source framework from Apache and is used to store process and analyze data which are very huge is volume.
5) PATRIC is a _____ database.

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

a) Write a note on BLAST variants.
b) Give an account on OMIM database.
c) Describe structure visualization tools.
d) Explain protein interaction network.

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

a) Give a detailed account on genome projects of *E. coli.*
b) Write a note on types of scoring matrices.

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

a) Explain in detail gene expression analysis using statistical methods.
b) Write a note on structural and functional genomics.

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

a) Explain in detail steps involved in protein tertiary structure prediction.
b) Explain the pathogen databases.

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

a) Explain in detail the generation of regulatory network using WGCNA.
b) Describe advantages of systems biology approach.

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

a) What is big data? Describe the importance of big data analytics.
b) Write a note on different tools used to support big data analytics.

SLR-HC-7

Seat No.		Set	P

M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Microbiology and Immunology (MSC27202)

Day & Date: Saturday, 11-05-2024 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) The process of _____ is called isolation.
   a) Purification of culture
   b) Introduction of inoculum
   c) Separation of a single microbe
   d) To grow microorganisms on surfaces

2) The viruses that live as parasites on bacteria are called _____.
   a) Fungi b) Commensels
   c) Bacteriophages d) Phytophages

3) Interferons are _____.
   a) Cytokine barriers b) Physical barriers
   c) Cellular barriers d) Physiological barriers

4) _____ bacteria is rod shaped.
   a) Cocci b) Comma forms
   c) Bacilli d) Plemorphic froms

5) _____ is the first cell which recruited at the place of infection.
   a) Nk cells b) Basophils
   c) Neutrophils d) Macrophage

6) _____ produce and release large amounts of antibody.
   a) Memory cells b) Basophils
   c) Plasma cells d) Killer cells

7) The stain used to demonstrate fungus is _____ stain.
   a) Albert b) Nigrosin
   c) Lactophenol cotton blue d) safranine

8) _____ is the process responsible for naturally acquired active immunity in humans.
   a) vaccination
   b) drinking colostrum
   c) natural birth
   d) infection with disease-causing organism followed by recovery.

9) Unicellular eukaryotes are grouped in _____.
   a) Monera b) Protista
   c) Archaea d) Fungi

10) _____ is called as the secretory antibody.
   a) IgA b) IgD
   c) IgG d) IgM

B) Fill in the blanks **06**

1) _____ is the broad term for an elevated white blood cell (WBC) count.
2) _____ is the example of cytokine made by lymphocytes.
3) _____ are organisms with the ability to thrive in extreme environments such as hydrothermal vents.
4) _____ a colourless liquid containing white blood cells that cleans the inside of your body and helps to prevent infections from spreading.
5) _____ are viruses that infect and replicate only in bacterial cells
6) _____ is a condition in which the body's immune system mistakes its own healthy tissues as foreign and attacks them.

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

a) Write a note on WIDAL test.
b) Write a note on Thermophilic bacteria.
c) Give methods for preservation of bacteria.
d) Write a note on radiations used for sterilization.

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

a) What is Antisepsis? Explain with one example.
b) Write a principle of Lyophilization.

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

a) What is Staining? Explain in detail Differential staining.
b) Primary immune response.

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

a) Describe structure of Archaebacteria.
b) Describe in detail production of monoclonal antibodies.

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

a) Describe mechanism of Replication in T4 bacteriophage.
b) Explain in detail the methods for sterilization.

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

a) Give a detailed account of Vaccines & its types.
b) Describe mechanism of Transformation.

SLR-HC-8

Seat No.	

Set P

M.Sc. (Semester - II) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Biochemistry and Biotechnology (MSC27206)

Day & Date: Tuesday, 14-05-2024 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. **10**

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

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

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

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

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

6) _____ is reduction potential.
   a) The molecule loses an electron
   b) Reducing the power of an electron
   c) A molecule gains an electron
   d) Oxidation power of an electron

7) _____ is the factor which is not responsible for the actual change in free energy.
   a) Temperature
   b) Pressure
   c) The initial concentration of reactant and products
   d) pH

8) The simplest amino acid is _____
   a) Glycine b) Alanine
   c) Asparagine d) Tyrosine

9) Amino acids are mostly synthesised from _____
   a) Fatty acids b) mineral salts
   c) α-ketoglutaric acid d) Volatile acids

10) Maltose is a disaccharide consists of _____
   a) Glucose and fructose
   b) Glucose and galactose
   c) Glucose and sucrose
   d) Glucose and glucose

B) Write true/false. **06**

1) Sodium chloride is used for the synthetic seed preparation.
2) Primary cell culture is type cell culture has a finite lifespan.
3) The gene formed by the joining of DNA segments from two different sources are called as chimeric gene.
4) Reducing agent of the molecule which donates its electrons.
5) Cysteine amino acids must to be supplemented in the diet.
6) Glucose is a reducing sugar.

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

a) Define Bioenergetics and mention application of thermodynamics.
b) Write a note on factors involved in controlling of enzyme activity.
c) Write a note on any two metabolic disorders.
d) Explain different types of vectors.

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

a) Describe in detail the molecular genetic analysis of human disease.
b) Discuss the role of ATP as source of free energy in biological systems.

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

a) Explain the mechanism of enzymes action.
b) Discuss different forms of nucleic acids.

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

a) Discuss different types of animal cell culture media Application of tissue culture.
b) Explain types of gene therapy and its applications.

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

a) Describe the classification and nomenclature of enzymes and its action of mechanism.
b) Discuss the different types of cell culture techniques used in animal cell culture.

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

a) What are GMOs? and give advantages and disadvantages of GMOs.
b) Write a note different law of thermodynamics.

SLR-HC-10

Seat No.	

Set P

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Biological Database Management System (MSC27301)

Day & Date: Friday, 10-05-2024 Max. Marks: 80
Time: 11:00 AM To 02:00 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) What does DDL stand for in the context of Database Management?
   a) Data Description Language
   b) Data Definition Language
   c) Data Designation Language
   d) Data Development Language

2) Which of the following is a limitation of traditional file processing systems?
   a) Efficient data retrieval b) Redundancy of data
   c) Easy data sharing d) Simplicity in data organization

3) What is a primary advantage of using a Database Management System (DBMS)?
   a) Increased data redundancy b) Enhanced data security
   c) Limited data sharing d) Simplified data retrieval

4) In the context of Database Architecture, what does DML stand for?
   a) Data Definition Language b) Data Designation Language
   c) Data Description Language d) Data Manipulation Language

5) What is a function of DBA (Database Administrator) in a DBMS?
   a) Data retrieval b) Data deletion
   c) Database design d) Data presentation

6) Which type of entity is not able to exist without being associated with another entity?
   a) Strong entity b) Weak entity
   c) Composite entity d) Primary entity

7) What does ER stand for in ER model in the context of conceptual database modeling?
   a) Entity-Relational b) Entity-Relation
   c) Entity-Relationship d) Entity-Record

8) In Relational Algebra, what is used to combine tuples from two relations?
   a) Intersection b) Union
   c) Join d) Division

9) What is the primary goal of Data Mining technology?
   a) Data Storage b) Data Retrieval
   c) Pattern Discovery d) Data Presentation

10) Which of the following is a characteristic of relations in the Relational Model?
   a) Redundancy b) Uniqueness
   c) Complexity d) Inconsistency

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

1) In ER modeling, an _____ represents a real-world object or concept.
2) DDL is used for defining the _____ of the database.
3) 2NF stands for Second _____.
4) The process of dividing a relation into smaller, well-structured relations is known as _____.
5) Oracle's data dictionary contains metadata about the database, such as table names and _____.
6) SQL stands for Structured Query _____.

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

a) What is Oracle? Explain.
b) Define the term 'integrity'. Explain the types of integrity.
c) What are the types of Database Languages? Explain with example.
d) Explain the structure of PL-SQL with its data types.

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

a) Explain Data Model in detail.
b) Explain Normalization and its types with example.

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

a) What are the applications in Bioinformatics? Explain.
b) Discuss RDBMS in detail.

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

a) Explain different types of SQL commands.
b) What are the applications of Data mining? Explain.

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

a) What are the applications of Bioinformatics? Explain.
b) Write and explain Hospital Database Management System.

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

a) Define Entrez and Protein Information Resources (PIR) with its features in BDBMS.
b) Explain any four types of Keys with example.

SLR-HC-11

Set No.		Set	P

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Advanced Biophysical Techniques (MSC27302)

Day & Date: Monday, 13-05-2024 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. (MCQ) **10**

1) A substance giving 100% transmittance means _____.
   a) 0% absorption b) 100 % absorption
   c) 50 % absorption d) 0% transmittance

2) Electron microscope was first developed by _____.
   a) Ernst Ruska b) Robert Hook
   c) Hurtal S.M. d) Me Intosh J.R.

3) FACS uses _____.
   a) Heavy isotopes b) radioactive elements
   c) immunological techniques d) energy content

4) The bond formed by the transfer of electrons between the atoms is called _____ bond.
   a) Electrovalent b) Covalent
   c) Coordination d) Metallic

5) Scanning probe/tip is used in _____.
   a) SEM b) TEM
   c) AFM d) Fluorescent

6) Bone fractures can be detected by _____.
   a) X-rays b) Gamma rays
   c) Radioactivity d) all of the above

7) Delicate surgeries can be performed by _____.
   a) IR b) Lasers
   c) X-rays d) XRD

8) Quartz cuvette is used for the wavelength range _____.
   a) 400-780nm b) 2-180nm
   c) 200-400nm d) 800nm-1600nm

9) ESR spectroscopic technique involves absorption of radiation in _____ region of Electromagnetic spectrum.
   a) Visible b) Microwave
   c) UV d) Infra Red

10) _____ absorb light energy of a specific wavelength and re-emit at longer Wavelength.
   a) Radiations b) Pigments
   c) Fluorochromes d) All of the above

B) Write true or false. **06**

1) Electro spray ionization (ESI) is a protein ionization method in mass spectroscopy.
2) Laser beam is not an electromagnetic radiation.
3) Three dimensional topological images are formed by TEM.
4) X-rays were discovered by W.C. Rontgen.
5) Radiation therapy is not used for treatment of cancer.
6) Proteins in solutions can be studied by CD spectroscopy.

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

a) Write a short note on Covalent bond.
b) Write the importance of electromagnets in electron microscopy.
c) What is Raman Microscopy used for?
d) What is the fingerprint region of IR spectroscopy?

Q.3 Answer the following.

a) Give the basic working principle involved in NMR. **08**
b) What are the characteristics of Co-ordination bond? **08**

Q.4 Answer the following.

a) Comment on the basic working principle of lasers. **08**
b) Explain the Principle and instrumentation of Electron spin resonance. **08**

Q.5 Answer the following.

a) Write a note on Confocal Microscopy. **08**
b) Write the principle and instrumentation of FTIR. **08**

Q.6 Answer the following.

a) Differentiate between the images formed by a Scanning electron microscope and Transmission electron microscope. **10**
b) How is mass spectrometry useful in protein analytical studies? **06**

Q.7 Answer the following.

a) Describe principle, working and applications of FACS. **10**
b) What are the sources of X-radiation? Where are they used? **06**

SLR-HC-12

Set No.		Set	P

M.Sc. (Semester - III) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Computational Structure Biology and Drug Designing (MSC27306)

Day & Date: Wednesday, 15-05-2024 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) Major site of drug metabolism is _____.
   a) Lung b) Liver
   c) Kidney d) All of these

2) _____ is not a type of protein secondary structure.
   a) Alpa helix b) beta sheet
   c) Loop d) Folds

3) _____ is visualization tool which prefers PDB format.
   a) Cn3D b) RasMol
   c) RasTop d) PyMol

4) _____ is a useful tool for analyzing the quality of protein structures and identifying errors in the backbone conformation.
   a) Ramachandran plot b) Ramakrishnan plot
   c) Sasisekharan plot d) Above all

5) Pharmacokinetics involves _____.
   a) Absorption b) Distribution
   c) Metabolism d) All of these

6) GOR, SOPMA are _____ protein structure prediction.
   a) Primary b) Secondary
   c) Tertiary d) Quaternary

7) Since both the ligand and the protein are flexible, a "_____" analogy is more appropriate than "lock-and-key".
   a) glove-in-hand b) hand-in-glove
   c) glove-in-glove d) hand-in-hand

8) _____ is a measure of the extent to which an amino acid residue is exposed to the solvent.
   a) Solute accessibility b) Solvent accessibility
   c) Gas accessibility d) Semi-liquid accessibility

9) _____ stands for Protein Data Bank in Europe Chemical Component Dictionary.
   a) PDBeChem b) PDBeChemdraw
   c) PDBeChemcheck d) Above all

10) Drugs are approved by _____.
   a) FAD b) FDD
   c) FDA d) FAAD

B) Write True /False. **06**

1) TMHMM stands for Trans Membrane Hidden Markov Model.
2) AACompIdent is a web application that identifies proteins from their amino acid composition.
3) SWISS-MODEL is a structural bioinformatics web-server dedicated to homology modeling of 3D protein structures.
4) In PDBeChem, Code: This is the PDB 3 letter code for the ligand (e.g. ATP).
5) In multiple sequence alignment PSI-BLAST is the most common example which successively identify more distantly related homologs.
6) ProSearch is a software tool that can be used for identification and characterization of proteins.

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

a) Write on Identification and characterization of Protein.
b) Write a note on ExPasy server.
c) Write a note on protein-protein interaction.
d) Write a note on Statistical methods used Garnier Osguthorpe-Robson method.

Q.3 Answer the following.

a) Write a note on Homology modelling. **10**
b) Write note on Ramachandran plot. **06**

Q.4 Answer the following.

a) Write a note on DOCKING. **10**
b) Write a note on principles of drug development. **06**

Q.5 Answer the following.

a) Write a note on 'Importance of 3_{10} helix and loops' in secondary structure prediction. **10**
b) Write a note on Challenges of Structural bioinformatics. **06**

Q.6 Answer the following.

a) Write a note on QSAR. **10**
b) Write a note on Importance and Prediction of solvent accessibility regions. **06**

Q.7 Answer the following.

a) Write a note on Statistical methods used in Neural network method. **10**
b) Write a note on Molecular interaction. **06**

SLR-HC-14

Set No.		Set	P

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Biological Simulation and Modeling (MSC27401)

Day & Date: Thursday, 09-05-2024 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) _____ is a computer simulation method for analyzing the physical movements of atoms and molecules.
   a) Molecular simulation b) Molecular dynamics
   c) Simulation d) All of these

2) _____ is a method which predicts the preferred orientation of one molecule to a second when a ligand and a target are bound to each other to form a stable complex.
   a) Biomacromolecules dynamics
   b) Docking
   c) RasMol
   d) PyMol

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

4) _____ in its broadest sense, is intelligence exhibited by machines, particularly computer systems, as opposed to the natural intelligence of living beings.
   a) Artificial intelligence b) Quantum science
   c) Simulations d) Above all

5) _____ are large biological polymers, such as nucleic acids, proteins, and carbohydrates, that are made up of monomers linked together.
   a) Macromolecules b) Bioengineered molecules
   c) Biomacromolecules d) All of these

6) _____ is a high-level, general-purpose programming language.
   a) Python b) Bison
   c) Bias d) Hexan

7) _____ is a numerical method used to integrate Newton's equations of motion.
   a) Adiabatic b) Verlet algorithm
   c) Docking d) All of these

8) _____ uses classical mechanics to model molecular systems.
   a) Molecular kinetics b) Molecular dynamics
   c) Molecular simulation d) Molecular mechanics

9) _____ is a programming paradigm based on the concept of objects.
   a) PPP b) OPP
   c) POP d) OOP

10) Potential energy is defined as _____ energy.
   a) stored b) moving
   c) shared d) transferred

B) Write True or False. **06**

1) Extension of the Python files is '.py'.
2) By solving the Schrödinger equation, quantum chemists can explain and even predict the properties of certain compounds.
3) Force-field methods use classical type models to predict the energy of a molecule as a function of its conformation.
4) Python libraries are often referred to as "modules" or "packages".
5) Biopython is a set of freely available tools for biological computation written in Python.
6) Adiabatic simulations in Molecular Dynamics assumes that it remains in the same quantum state, without transitions between states.

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

a) Write a note on applications of molecular mechanics.
b) Write a note on energy minimization.
c) Write note on applications of simulation.
d) Write any four features of python and explain it.

Q.3 Answer the following.

a) Explain a detail account on Python modules. **10**
b) Give a detail account on Python object system. **06**

Q.4 Answer the following.

a) Write a note on Newton's equation for particles and types of dynamics simulations. **10**
b) Write a note on Introduction to Artificial Intelligence. **06**

Q.5 Answer the following.

a) Write a note on molecular dynamics with examples. **10**
b) Write a note on biological models in simulations. **06**

Q.6 Answer the following.

a) Write a note on docking simulations. **10**
b) Write a note Concept of molecular conformational search. **06**

Q.7 Answer the following.

a) Write a note on mechanics of biomacromolecules. **10**
b) Write a note on geometry optimization. **06**

SLR-HC-15

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Clinical Bioinformatics (MSC27402)

Day & Date: Saturday, 11-05-2024 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) Meta _____ is the study of genetic material recovered directly from environmental samples.
   a) phobia b) genomics
   c) case d) stat

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) Galaxy is open source and browser based, it can be accessed by anyone and is free of charge for creation of _____.
   a) working b) workflows
   c) programme d) functions

4) _____ is a state of physical, mental and social well-being in which disease and infirmity are absent.
   a) Disease b) Health
   c) Help d) Hepatitis

5) _____ 's portal providing access to data and analyses for monitoring the global health situation.
   a) TWO b) WHO
   c) NOW d) HWO

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) Basic b) Biomedical
   c) Biology d) Bioinformatics

7) Bacteria are a type of microorganism, which are tiny forms of life that can only be seen with a _____.
   a) computer b) microscope
   c) machine d) electric

8) Volume _____ tabular list of diagnosis codes in ICD.
   a) 1 b) 3
   c) 4 d) 5

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) SAGE database it stands for serial analysis of _____ expression,
   a) gene b) genome
   c) genotype d) phenotype

B) Write True/False. **06**

1) DNA microarrays to measure the expression levels of large numbers of genes simultaneously or to genotype multiple regions of a genome.
2) K is language for statistical modelling and graphics.
3) An infection is the invasion of an organism's body tissues by disease-causing agents, their multiplication, and the not reaction of host tissues to the infectious agents and not the toxins they produce.
4) The study of ADRs is the concern of the field known as pharmacovigilance
5) The most prevalent drug-metabolizing enzymes (DME) are the Cytochrome P450 (CYP) enzymes
6) A mathematical model is a description of a system using mathematical concepts and language.

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

a) Write a note on CRF designing in Clinical research?
b) Give a note on Human genome sequence project and applications?
c) What are the symptoms of respiratory diseases?
d) Explain the pharmacological class of drugs?

Q.3 Answer the following.

a) Write in detail of Next generation sequencing quality control tools? [8] **08**
b) Explain the clinical research and types of clinical research? **08**

Q.4 Answer the following.

a) Give a detailed account on Host pathogen interaction and tool or database for host pathogen interactions? **08**
b) Give a detailed account on Pathology informatics and tools for analysis of pathology informatics? **08**

Q.5 Answer the following.

a) What ICH and guidelines for good clinical practices in clinical research? **08**
b) Give a detailed note on Genome assembly and its types? **08**

Q.6 Answer the following.

a) Explain the RNA sequence analysis and its application in transcriptomics and microarray data analysis? **10**
b) What is medical coding and steps of medical coding? **06**

Q.7 Answer the following.

a) Explain International classification of disease and give the details pharmcovigilance? **10**
b) Write a note on A. thaliana Genome project and its applications in detail? **06**

SLR-HC-16

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Research Methodology and IPR in Bioinformatics (MSC27403)

Day & Date: Tuesday, 14-05-2024 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) Choose the correct alternative. (MCQ) **10**

1) The first step of research is:
   a) Selecting a problem b) Searching a problem
   c) Finding a problem d) Identifying a problem

2) Research can be conducted by a person who:
   a) Holds a postgraduate degree
   b) Has studied research methodology
   c) Possesses thinking and reasoning ability
   d) is a hard worker

3) To test null hypothesis, a researcher uses:
   a) T test b) ANOVA
   c) X^2 d) factorial analysis

4) Bibliography given in a research report:
   a) Shows vast knowledge of the researcher
   b) Helps those interested in further research
   c) Has no relevance to research
   d) All the above

5) The study in which the investigators attempt to trace an effect is known as:
   a) Survey Research b) Summative Research
   c) Historical Research d) 'Ex-post Facto' Research

6) A generalized conclusion on the basis of a sample is technically known as:
   a) Data analysis and interpretation
   b) Parameter inference
   c) Statistical inference
   d) All of the above

7) The main characteristics of scientific research is:
   a) Empirical b) Theoretical
   c) Experimental d) all of the above

8) A null hypothesis is
   a) When there is no difference between the variables
   b) The same as the research hypothesis
   c) Subjective in nature
   d) When there is difference between the variables

9) A common test in research demands much priority on _____.
   a) Reliability b) Useability
   c) Objectivity d) All of the above

10) A Research is a _____.
   a) Lab experiment
   b) Systematic and scientific inquiry
   c) Report
   d) Procedure

B) Fill in the blanks OR Write true/false **06**

1) Action result is research carried out to solve immediate problems
   a) True b) False
2) The research that applies the laws at the time of field study to draw more and more clear ideas about the problem is called as applied research.
   a) True b) False
3) Plagiarism is unethical
   a) True b) False
4) In order to pursue the research, formulating the research question is priorly required
   a) True b) False
5) Formulation of a problem is the first and foremost step in a research process.
   a) True b) False
6) After the formulation and identification of a problem, the next important step is the review of the literature survey.
   a) True b) False

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

a) Explain what is research and its objectives.
b) Explain the types of research.
c) Explain the concept of plagiarism.
d) Explain the steps involved in data collection methods.

Q.3 Answer the following.

a) Explain in detail about IMRAD **08**
b) Explain what is meant by data collection, its types, relevance, and limitations. **08**

Q.4 Answer the following.

a) Describe in brief the intellectual property rights and its protection. **08**
b) Explain what is meant by a patent and describe the paten procedure in India. **08**

Q.5 Answer the following.

a) Describe the International Union for the Protection of New Varieties of Plants (UPOV). **08**
b) Explain what is meant by mean, proportion, and variance. **08**

Q.6 Answer the following.

a) Explain the steps involved in scientific proposal writing and funding agencies such as UGC, CSIR, DBT. **08**
b) Describe the selection and formulation of the research problem. **08**

Q.7 Answer the following.

a) Explain the research design and formulation of the hypothesis. **08**

b) Describe the chi-square test and ANOVA test used in sampling techniques. **08**

SLR-HC-17

Seat No.		Set	P

M.Sc. (Semester - IV) (New) (CBCS) Examination : March/April – 2024
BIOINFORMATICS
Emerging Areas of Bioinformatics (MSC27406)

Day & Date: Thursday, 16-05-2024 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. **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) H1N1 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 Species 2000 and TDWG database with its standard and protocols? **10**
b) Explain the single nucleotide polymorphism with applications in personalized medicine? **06**

SLR-HC-18

Seat No.	

Set P

M.Sc. (Semester - IV) (New) (CBCS) Examination: March/April-2024
BIOINFORMATICS
Medical Biotechnologies and Bio-Nanotechnology (MSC27407)

Day & Date: Thursday, 16-05-2024 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. **10**

1) _____ enzyme is present in tears of eyes.
   a) Lysozyme b) Catalase
   c) Oxidase d) Hydroxylase

2) Amoebiasis is caused by _____.
   a) *Plasmodium vivax* b) *Aspergillus oryzae*
   c) *Candida albicans* d) *Entamoeba histolytica*

3) Nystatin is _____ drug.
   a) Antifungal b) Antibacterial
   c) Antiviral d) Anti protozoal

4) The melting point of particles in nano form
   a) Increases b) Decreases
   c) Remains the same d) Increases then decrease

5) _____ pathogens causes cholera in humans.
   a) Fungi b) Bacteria
   c) Virus d) Protozoan

6) Photosensitizing dyes are used to inactivate viruses in _____.
   a) Photolysis b) Photophosphorylation
   c) Photodynamic inactivation d) Photosynthesis

7) _____ a device which combines a biological component with physicochemical detector.
   a) Biosensor b) Bioreceptor
   c) Bioluminsor d) Bioradiator

8) Nanoscience can be studied with the help of _____.
   a) quantum mechanics b) Newtonian mechanics
   c) macro-dynamics d) Geophysics

9) Candidiasis is caused by _____.
   a) Bacteria b) Fungi
   c) Virus d) Protozoa

10) An important drug used for the treatment of malaria - Quinine is extracted from _____.
   a) Root of neem b) Calyx of cinnamon
   c) Bark of Tulsi d) Bark of Cinchona

B) Write true or false. **06**

1) Self cleaning coatings are made of Titanium dioxide.
2) Chemotherapy is the best treatment for all forms of Cancer.
3) Malaria is caused by a virus.
4) Polymyxins are a class of chemotherapeutics.
5) Sputtering and chemical vapor deposition is biological methods of Nanosynthesis.
6) Overuse of antibiotics has given rise to Superbugs which are drug resistant.

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

a) Enlist antifungal drugs used for treating human diseases.
b) Pathogenesis of HSV
c) Normal Human micro flora.
d) Principle of Chemotherapy.

Q.3 Answer the following.

a) Write the scope of Bio-nanotechnology. **08**
b) Discuss the mode of Action of Penicillin on the bacterial cell wall. **08**

Q.4 Answer the following.

a) Give the applications of Nanoparticles in environmental cleaning. **08**
b) Define Syndrome. Write a note on the molecular diagnosis of diseases with the help of an example. **08**

Q.5 Answer the following.

a) Write a note on the applications of Biosensors. **08**
b) Describe the pathology of human diseases caused by bacteria. **08**

Q.6 Answer the following.

a) Define Syndrome. Write a note on the molecular diagnosis of diseases with the help of an Example. **10**
b) Define Chemotherapy. Write the Principles involved in Chemotherapy. **06**

Q.7 Answer the following.

a) Write a note on the various methods of synthesis of Nanostructures. **10**
b) Comment on the various applications of nanomaterials as biosensors. **06**