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M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018

Bioinformatics

ADVANCED BIOINFORMATICS

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section-1, Question 1 is compulsory.
 2) Attempt any four questions from Section-II.
 3) Figures to the right indicate full marks.
 4) Answer to the Section-I and Section-II are to be written in same answer Booklet only.

Section – I

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

- 1) In S-W algorithm the trace back begins at the _____ value found anywhere in the matrix.
 - a) Minimum
 - b) Zero
 - c) Maximum
 - d) None of these
- 2) KEGG stands for _____.
 - a) Kyoto Encyclopedia of Genome
 - b) Kyoto Encyclopedia of Genes and Genomes
 - c) Kyoto Encyclopedia Graph
 - d) All of these
- 3) ORF stands for _____.
 - a) Old Reader Field
 - b) Open Reading Flank
 - c) Open Reading frame
 - d) None of these
- 4) Each amino acid corresponds to a _____ turn in an alpha helix.
 - a) 120°
 - b) 100°
 - c) 85°
 - d) None of these
- 5) In Dali-lite program graphical result is viewed by _____ viewer.
 - a) Jet
 - b) Jlib
 - c) Jmol
 - d) All of these
- 6) Phylogenetic relationship can be shown by _____.
 - a) Data retrieving tool
 - b) Data search tool
 - c) Dendogram
 - d) Genbank
- 7) _____ is a tool for Computing, Evaluating and Manipulating Multiple Alignments of DNA, RNA, Protein Sequences and structures.
 - a) Phylogibb
 - b) Dotlet
 - c) SIBsim4
 - d) T-Coffee

B) Definition:

- 1) Coiled coils
- 2) Genomics
- 3) Phylip
- 4) Molecular Clock
- 5) Proteomics
- 6) Introns
- 7) EC

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

- Q2** Explain the Needleman and Wuncsh algorithm for pair wise alignment and its implementation. **14**
- Q3** Explain molecular taxonomy and phylogeny in details and also add a detailed a note on maximum parsimony and maximum likelihood methods. **14**
- Q4** Give a detailed description on KEGG pathway database and add a note on its applications. **14**
- Q5** **Answer any two of the following.** **14**
- a) Explain SNP database in details.
 - b) Explain the Mega blast algorithm and add a note of BLAST2.
 - c) Give a description on the secondary structural elements.
- Q6** **Write short note any two of the following.** **14**
- a) UPGMA
 - b) EXPASY Server
 - c) PAM Matrices

Seat No.	
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M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Bioinformatics
MICROBIOLOGY AND BIOTECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section-I, Question 1 is compulsory.
 2) Attempt any four questions from Section-II.
 3) Figures to the right indicate full marks.
 4) Answer to the Section-I and Section-II are to be written in same answer Booklet only.

Section – I

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

- 1) _____ belongs to three domains of life.
 - a) Archaea
 - b) Bacteria
 - c) Eukarya
 - d) All of these
- 2) In _____ process the genetic material is transferred from donor to recipient cell through virus.
 - a) Transduction
 - b) Conjugation
 - c) Transformation
 - d) None of these
- 3) In _____ phase the growth rate is equal to death rate.
 - a) Lag
 - b) Log
 - c) Stationary
 - d) Decline
- 4) Sterilization by UV light is called _____.
 - a) Wet
 - b) Chemical
 - c) Physical
 - d) None of these
- 5) DNA is transferred into the cells that produce reproductive cells, eggs or sperm, in the body is called _____ gene therapy.
 - a) Somatic
 - b) Germ line
 - c) Both a and b
 - d) None of these
- 6) _____ classified viruses based on genetic material.
 - a) Baltimore
 - b) Watson
 - c) Ion Wilmut
 - d) None
- 7) Radioactive compounds are used in _____.
 - a) Primers
 - b) Probes
 - c) Plasmids
 - d) All of these

B) Definitions. 07

- 1) Totipotency
- 2) Endospore
- 3) 16S rRNA
- 4) MC Site
- 5) T4 Bacteriophage
- 6) SCO
- 7) ddNTPs

Section – II

- Answer any four of the following.**
- Q.2** Describe the single cell protein and single cell oil. Add a note their applications. **14**
- Q.3** Explain bacterial artificial chromosomes and yeast artificial chromosomes. **14**
- Q.4** Explain the techniques for isolation of microorganisms. **14**
- Q.5** **Answer any two of the following.** **14**
- a) Applications of recombinant DNA Technology.
 - b) Structural staining in bacteria.
 - c) Growth kinetics.
- Q.6** **Write short note any two of the following.** **14**
- a) Mycoplasma
 - b) Different media used for plant tissue culture
 - c) Bacterial transduction

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

- Q2** Explain the structural classification of proteins. **14**
- Q3** Write a detailed note on innate immunity. **14**
- Q4** Explain different types of antigen antibody interactions. **14**
- Q5** **Answer any two of the following.** **14**
- a) Write a note on functions of vitamins.
 - b) Add a note on classifications of nucleic acids.
 - c) Define enzyme. Write a note on their classification.
- Q6** **Write short notes on any two.** **14**
- a) Protein folding
 - b) Cytokines
 - c) Hybridoma technology

Seat No.	
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**M.Sc. (Semester - II) (CBCS) Examination Mar/Apr-2018
Bioinformatics**

INDUSTRIAL AND ENVIRONMENTAL BIOTECHNOLOGY

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Section-I is compulsory.
2) Attempt any four questions from Section - II
3) All Questions carry equal marks.
3) Figures to the right indicate full marks.
4) Answer to the Section – I and Section – II are to be written in same answer Booklet only.

Section – I

Q.1 A) Complete the sentences by selecting correct answer from the given alternatives: 07

- 1) Sterilization refers to
 - a) Destruction of Microorganisms
 - b) Removal of Microorganisms
 - c) Both a and b
 - d) Either a or b
- 2) Rheology property of fermentation Broth _____.
 - a) Viscosity
 - b) Oxygen
 - c) Temperature
 - d) All of these
- 3) _____ are used for the mixing of broth and culture in fermentation process.
 - a) Impellers
 - b) Enhancers
 - c) Emulsifiers
 - d) None of these
- 4) Out of following _____ is found to be most carcinogenic.
 - a) PAH
 - b) Heavy metals
 - c) Textile dyes
 - d) Air pollutants
- 5) Phenyl acetic acid acts as a precursor for the production of _____.
 - a) Penicillin V
 - b) Penicillin G
 - c) Penicillin M
 - d) Cyclosporine
- 6) In Bioreactors _____ are used to prevent vortex formation.
 - a) Spargers
 - b) Impellers
 - c) Baffles
 - d) Both b and c
- 7) Amylase is a starch hydrolysing enzyme can be obtained by using _____.
 - a) *A. oryzae*
 - b) *S. Cerevisiae*
 - c) *B. licheniformis*
 - d) Both a and c

B) Definitions. 07

- 1) Microbial Nutrition
- 2) Microbial Enzyme
- 3) Scale up
- 4) Baffles
- 5) Bioremediation
- 6) Bioindicators
- 7) Xenobiotic

Section – II

Answer any four of the following.

- Q2** Describe about the microbial cell cultivation system. **14**
- Q3** Discuss in brief on kinetics of microbial growth. **14**
- Q4** Discuss the on energy source involved in fermentation process. **14**
- Q5** **Answer any two of the following.** **14**
- a) Batch Fermentation
 - b) Citric acid production
 - c) Solid liquid separation
- Q6** **Answer any two of the following.** **14**
- a) Non-conventional energy sources
 - b) Biosensor
 - c) Effect of heavy metals on environment

Part – II

Answer any four of the following.

- Q2** Add a note on biological models of simulation. **14**
- Q3** Write a note on molecular mechanics with reference to bio-molecules. **14**
- Q4** Explain string functions in python with examples. **14**
- Q5** **Answer any two of the following.** **14**
- a)** Add a note on full geometry optimization.
 - b)** Explain python editor in detail.
 - c)** Applications of simulations.
- Q6** **Write short note any two of the following.** **14**
- a)** Examples of molecular dynamics
 - b)** Files in python
 - c)** Input and output

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

- Q.2** Explain in detail the Neurodegenerative disorders. **14**
- Q.3** Explain Basic Next generation sequencing chemistry in details and note on microarray data analysis. **14**
- Q.4** Explain in human Genome Project with its Applications. Add note on Challenges of HGP. **14**
- Q.5** **Answer any two of the following.** **14**
- a) Explain Medical coding steps in details.
 - b) Describe host-pathogen interactions.
 - c) Explain transcriptomics in details.
- Q.6** **Write short notes on any two.** **14**
- a) Genome sequencing projects
 - b) ICD – 10
 - c) NGS applications

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**M.Sc. (Semester - IV) (New) (CBCS) Examination Mar/Apr-2018
Bioinformatics**

RESEARCH METHODOLOGY AND IPR IN BIOINFORMATICS

Time: 2 ½ Hours

- Instructions:** 1) Part-I, Question 1 is compulsory
2) Attempt any four questions from Part-II
3) Figures to the right indicate full marks.
4) Answer to the Part-I and Part-II are to be written in same answer Booklet only.

Part – I

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

- 1) ANOVA stands for _____.
a) Analysis Of Variable b) Analysis Of Vector
c) Analysis Of Variance d) None
- 2) Research means _____.
a) Enunciating a problem b) Framing a hypothesis
c) Collection of data d) All of these
- 3) _____ provide and promote an effective system of plant variety protection.
a) WIPO b) UPOV
c) Patent d) All of the above
- 4) Analyzing data which was collected by others is called _____.
a) Survey research b) Secondary analysis
c) Content analysis d) Primary analysis
- 5) Research done at one time is called _____.
a) Replication b) Correlational
c) Cross- sectional d) Longitudinal
- 6) _____ is a preferred sampling method for the population with finite size.
a) Area sampling b) Cluster sampling
c) Purposive sampling d) Systematic sampling
- 7) Kolhapuri Chappal is _____.
a) Patent b) Geographical indication
c) Trade mark d) Trade secrete

B) Definitions

07

- 1) Trade Design
- 2) Impact factor
- 3) Audio-visual aids
- 4) Sampling size
- 5) Impact factor
- 6) Action research
- 7) ISSN

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

- Q2** What is the meaning research? Explain in detail objectives and characteristics of research. **14**
- Q3** Give the different guidelines for writing introduction and materials & methods in the preparation of manuscript. **14**
- Q4** What is data collection? Explain different data collection methods? **14**
- Q5** **Answer any two of the following** **14**
- a) Write a note on advantages and disadvantages of PBR.
 - b) Write a note on procedure of patenting in India.
 - c) Write a note on Research Questions.
- Q6** **Answer any two of the following** **14**
- a) Preparation of poster for conference
 - b) ANOVA
 - c) Author instructions for IJBT

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

Time: 2½ Hours

Max. Marks: 70

- Instructions:** 1) Part-1, Question 1 is compulsory
 2) Attempt any four questions from Part-II
 3) Figures to the right indicate full marks.
 4) Answer to the Part-I and Part-II are to be written in same answer Booklet only.

Section – I

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

- 1) _____ are the immunoinformatics tools.
 - a) V-Quest
 - b) Epimatrix
 - c) TAP
 - d) All
- 2) The size of the nanoparticles are analyzed by _____.
 - a) UV
 - b) SEM
 - c) FTIR
 - d) All
- 3) SMILES is _____.
 - a) Simplified Molecular input line entry system.
 - b) Simple Molecular input line entry system.
 - c) Simple Molecular index line entry system.
 - d) Simplified Molecular index line entry system.
- 4) _____ is a federation of database organization access the world.
 - a) Catalogue of life
 - b) Vplants
 - c) TDWG
 - d) TIPR
- 5) _____ are the descriptors derived from Molecular formula.
 - a) 1D
 - b) 3D
 - c) 2D
 - d) 0D
- 6) Biodiversity informatics was coined by _____.
 - a) Ernst Haeckel
 - b) John Crenter
 - c) John whiting
 - d) None
- 7) _____ predicts whether an amino acid substitution affects protein function.
 - a) Polyphen-2
 - b) SIFT
 - c) KABAT
 - d) IEDB

B) Definitions:

07

- 1) ADMET
- 2) LSID
- 3) Bucky Ball
- 4) Species 2000
- 5) SNV
- 6) Cancer informatics
- 7) QSAR

Section – II

Answer any four of the following.

- Q.2** What is biodiversity informatics? Explain in detail national, regional and global biodiversity information system and networks? **14**
- Q.3** Explain chemical file formats in detail? Add a note on SMILES notation. **14**
- Q.4** Define immunoinformatics? Explain the future of computational modeling prediction in clinical immunology. **14**
- Q.5** **Answer any two of the following.** **14**
- a) Explain GBIF database in detail.
 - b) Synthesis of silver nanoparticles by biological method
 - c) Explain chemical structure representation.
- Q.6** **Write short notes on any two.** **14**
- a) ChEMBL
 - b) Bottom up and top down approach
 - c) SIFT and Polyphen-2.