INDUSTRY PROGRAM IN BIOINFORMATICS

Examination Assignments

April, 2017

Instructions for Examination Assignments – April, 2017

- Electronic (email), printed and hand written submission of the assignments are acceptable.

- Do not copy from the answers of other participants. If it is noticed the assignment of such participants will not be accepted.

- The assignment for each paper should be written separately. Do not write the assignment for all the papers in continuity. However, all the assignments are to be submitted together.

- No two or more participants should submit their assignments in same envelope.

- The participants should mention their Name and Enrollment Number on each page of submitted assignment copy.

- The last date of submission of Assignments is **30th April, 2017.**

- The assignments have to be submitted to:

  The Program Director
  Bioinformatics Institute of India
  H-109, Ground Floor, Sector-63, (Behind Haldiram) Noida-201307
  U.P. INDIA

- Participants are advised to keep a photocopy of submitted assignments.

- The participants should mention their Name and Enrollment Number on the envelope.

- The participant should also mention "Examination Assignment" at the top of the envelope.

- The result will be announced by 2nd week of June, 2017.

- For any query mail us on info@bii.in

Module 1: Introduction to Bioinformatics
Examination Assignment April, 2017

Max. Marks: 75

Instructions:

- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short Answer type Questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. What is the role of internet in bioinformatics?

2. How bioinformatics assist in drug designing?

3. Write a short note on Internet Protocol (IP).

4. What is Pattern mining?

5. What are the barriers to Pharmacogenomics Progress?

6. State "Bioinformatics: A theoretical and practical approach".

7. Explain Gene Therapy.

SECTION–B

Long Answer type Questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. What is the relationship between bioinformatics and statistics?

2. Explain Comparative Genomics and Functional Genomics.

3. Discuss the role of Bioinformatics in Pharmaceutical industry and Information technology.

4. Discuss the Human Genome Project in detail.

5. What is Agro-informatics? What is the emergence of Agro-informatics and what are the applications of Agro-informatics?

6. Is bioinformatics an interdisciplinary subject? Illustrate your answer with appropriate reason.

7. What are the bioinformatics potential and it's write its market growth?

Module 2: Biological Database &their Management

Examination Assignment April, 2017

Max. Marks: 75

Instructions:

- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. What are the Codd Rules?

2. Describe the uses of various Biological databases.

3. Describe the different types of SQL commands.

4. What are the factors that have to be considered when designing a relational database?

5. Explain the term Entities. What are attributes?

6. Write the file format of EMBL Nucleotide Sequence Database.

7. Define the following terms:

   (i) Entities (ii) Attributes (iii) Primary Keys (iv) Foreign Keys

SECTION–B

Long Answer type questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. Why the web is not considered the right database?

2. Explain Protein Sequence Databases.

3. What is SRS system? How SRS system is useful for biological databases?

4. What is Data Normalization? Explain all the three types of Normal forms and also other Normal forms.

5. Describe some Virological Databases.

6. Define DBMS and DBMS System. What is the difference between a Database and a Database System?

7. Explain Biodiversity. Why is Biodiversity Important? What is the problem with it? What can be done to conserve biodiversity? Explain World Biodiversity Database (WBD).

Module 3: Computational Biology

Examination Assignment April, 2017

Max. Marks: 75

Instructions:

- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. Write UPGMA algorithm briefly.

2. Write two types of sequence alignments. Explain them.

3. How to compute the physical Properties Based on Sequence?

4. Are there homologues in the databases?

5. Write a note on global alignment.

6. Give the reasons why protein searches are faster and more sensitive than DNA searches.

7. Describe the various types of Tree Style with their diagrammatic representation.

SECTION–B

Long Answer type questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. Describe briefly the two type's substitution matrices.

2. Explain the technique which is used to identify the genetic expressions.

3. List down some gene prediction software's? Also explain their function.

4. Explain MACCLADE and its features relevant to sequence analysis.

5. Write a detail note on "probe designing".

6. Why Phylogenetic analysis is important? When it is used?

7. What are the various Progressive Alignment methods?

Module 4: Molecular Genetics
Examination Assignment April, 2017

Max. Marks: 75

Instructions:
- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. What is Simple translocation?

2. What is Chromosome theory of linkage?

3. Explain the blood group system, where multiple alleles have been detected.

4. Give the overview of Cell Cycle.

5. Explain the Chiasmata type theory or one plane theory.

6. Explain why Mendel selected garden pea as his experimental material?

7. Define Allele. Give the characteristic features of multiple alleles.

SECTION–B

Long Answer type questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. What is repetitive sequencing technique?

2. DNA is genetic material. Prove it.

3. Explain translation in detail with the help of diagram.

4. Explain the concept of replication in eukaryotes.

5. What is Copolymer method of assigning of codons?

6. Explain Mendelian Law of Inheritance with an example.

7. What are the effects of chromosome doubling? Describe the cytology of autopolyploid.

Module 5: Bioinformatics Software
Examination Assignment April, 2017

Max. Marks: 75

Instructions:

- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. Write a short note on VMD.

2. What is protein weight matrix? Explain its types.

3. What are the stages in which the multiple alignments are carried out?

4. Write steps for running Gels and Orientation Analysis.

5. Write a short note on Rasmol.

6. Explain the Pairwise alignment parameter.

7. Describe the different drawing, coloring and selection methods for displaying the three dimensions structure of protein.

SECTION–B

Long Answer type questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. Explain three different computational modes of Geometry Optimization.

2. What are the Protein Weight Matrices in Phylip? Explain the matrices.

3. Explain the analysis of alignment quality.

4. What is the strategy for the finding the best tree?

5. What is homology modeling and how it is performed (*in silico*)?

6. Explain various tools to draw a structure in CHEMDRAW.

7. Describe the software tool oligo.

Module 6: Computational Tools For Molecular Biology
Examination Assignment April, 2017

Max. Marks: 75

Instructions:

- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)　　　　　　**5 × 5 = 25 Marks**

1. What are key technologies used in proteomics?

2. What are the basic cellular components?

3. What are the types of RNA?

4. Explain the term Tendem repeats.

5. What is PCR? Write its steps.

6. What is the genetic code?

7. What is the purpose of peptide mass fingerprinting?

SECTION–B

Long Answer type questions: (250-300 Words)　　　　　　**5 × 10 = 50 Marks**

1. Write a note on working of restrict tool.

2. DNA sequencing plays major role in research. Explain.

3. Write note on an Interactive PCR Primer Designing Tool.

4. Explain protein primary, secondary and tertiary structure

5. What are the steps involved in transcription factor binding site prediction?

6. Explain all the forms of DNA with diagrammatic representation.

7. Explain the DNA transcription factor binding site prediction steps using a tool.

Module 7: Biostatistics
Examination Assignment April, 2017

Max. Marks: 75

Instructions:
- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. What are the advantages and disadvantages of median?

2. Write a note on Coefficient of Determination.

3. What is Skewness?

4. Write the steps for finding Quartile for Small Data Sets.

5. What is geometric mean?

6. Define Probability? Write the Properties of Probability.

7. Write the properties of the Underlying Distribution of Response Data for a Chi-square Goodness Fit test.

SECTION–B

Long Answer type questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. What is sampling? Give its Characteristics.

2. Explain F-test and T-test with a suitable example.

3. What are the roles of biostatistics in Bioinformatics?

4. Explain the Central Limit theorem.

5. Describe the Central Limit Theorem and Confidence Intervals (CI).

6. Explain Poisson distribution?

7. What is the Representative Sample? What are the Advantages of sampling?

Module 8: Bioprogramming
Examination Assignment April, 2017

Max. Marks: 75

Instructions:
- SECTION-A: Attempt any five questions.
- SECTION-B: Attempt any five questions.

SECTION–A

Short answer type questions: (60-80 Words)   **5 × 5 = 25 Marks**

1. What are nested loops? Give examples.

2. Discuss the role of PERL in CGI.

3. What are global variables and local variables?

4. Explain Passing By Value and Passing by Reference.

5. Write the limitations of Procedural Programming languages.

6. Explain the conditional statement 'For' loop.

7. Write a note on data types.

SECTION–B

Long Answer type questions: (250-300 Words)   **5 × 10 = 50 Marks**

1. Write a note on BIOPERL.
2. Give an introduction to an Array and how they are defined?
3. Explain with an example "Real World Modeling with OOP".
4. Explain overloading functions?
5. Write a note on File Handling in PERL with an example.
6. What are Multidimensional arrays?
7. What are the difference between procedural Programming and Object-Oriented Programming?