



# Bioinformatics Institute of India

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## Introductory 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 **30<sup>th</sup> 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 2<sup>nd</sup> week of June, 2017.
- For any query mail us on [info@bii.in](mailto:info@bii.in)



**Module 1: Introduction To Bioinformatics**  
**Examination Assignment April, 2017**

**Max. Marks: 100**

**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 Hypertext Transfer Protocol?
2. What are the Goals of Bioinformatics?
3. What is role of internet in Bioinformatics?
4. What is the role of bioinformatics in R&D sector?
5. Write a short note on current challenges to bioinformatics.
6. Write a short note on Comparative Genomics.
7. How bioinformatician assists in Drug designing?

**SECTION B**

**Long Answer type questions: (250-300 Words)**

**5 × 15 = 75 Marks**

1. Describe the Major Data Mining Tasks.
2. What is the relationship between bioinformatics and statistics?
3. Write short notes on NCBI, EBI & Pub-Med.
4. Explain Cheminformatics and System Biology as the emerging dimensions of bioinformatics.
5. Explain Comparative Genomics and Functional Genomics?
6. What is gene therapy? What are the ways for correcting faulty genes?  
What are the bioinformatics potential and write its market growth?



**Module 2: Biostatistics**  
**Examination Assignment April, 2017**

**Max. Marks: 100**

**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. Define Variance and Standard Deviation.
2. What are the advantages and disadvantages of median?
3. Discuss the Central Limit Theorem.
4. Write a short note on Coefficient of Correlation.
5. What is Poisson distribution?
6. What is range? Give an Example.
7. Discuss the probability distribution, mean and variance for a binomial random variable.

**SECTION B**

**Long Answer type questions: (250-300 Words)**

**5 × 15 = 75 Marks**

1. What are the advantages and disadvantages of Mode?
2. Explain Sampling with a suitable example? Give its Characteristics.
3. Give the formula for conditional probability.
4. How HMMs used for modeling a family of related sequences, such as a family of proteins.
5. Explain Bayes' Theorem. In a library box, there are 8 novels, 8 biographies, and 8 war history books. If Jack selects two books at random, what is the probability of selecting two different kinds of books in a row?
6. Write a note on Hypothesis testing.
7. Find the mode in this set of data:-  
Size of shoes:            5    6    7    8    9  
No. of customers:        34  35  55  40  31



**Module 3: Biological Database & Their Management  
Examination Assignment April, 2017**

**Max. Marks: 100**

**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 Data Modeling Components?
2. What a Database system can provide?
3. Write a note on SRS System.
4. What is unique index?
5. What is clustered index?
6. What are the components of a Database Management System?
7. What are the different types of Constraints?

**SECTION B**

**Long Answer type questions: (250-330 Words)**

**5 × 15 = 75 Marks**

1. Discuss the various types of Joins.
2. Why the web is not considered the right database?
3. Explain KEGG in detail.
4. Describe the different types of SQL commands.
5. Discuss Biological Databases and their Importance.
6. Discuss the Data Modeling 'Rules of Thumb'.
7. Discuss Primary sequence Databases.



**Module 4: Bioinformatics Software**  
**Examination Assignment April, 2017**

**Max. Marks: 100**

**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 Phylogenetic trees?
2. Write a note on GCK.
3. Give the Introduction of A Structure Drawing Tool.
4. Explain the pairwise alignment parameter.
5. Explain the different types of protein gap parameters.
6. Write the name of all the 31 programs in Phylip Package.
7. ClustalX has two modes which can be selected using the switch directly above the sequence display. Discuss these.

**SECTION B**

**Long Answer type questions: (250-300 Words)**

**5 × 15 = 75 Marks**

1. What are the Protein Weight Matrices in Phylip? Explain the matrices.
2. Write the steps for cloning a DNA segment and Silent Mutation.
3. Explain the Program feature of OLIGO?
4. What are the Quality score parameters?
5. What are the secondary structure parameters? Describe.
6. Write some command line Parameters with their description used in ClustalX.
7. Write a note CACHE Computer Aided Chemistry.



**Module 5: Computational Biology**  
**Examination Assignment April, 2017**

**Max. Marks: 100**

**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 note on Bootstrap.
2. Explain the statistical significance of hits.
3. What are the salient characteristics of FASTA?
4. Write two types of sequence alignments. Explain them.
5. What are DNA Repeats and DNA satellites?
6. What is Profile scan?
7. Write a brief note on SOPMA.

**SECTION B**

**Long Answer type questions: (250-300 Words)**

**5 × 15 = 75 Marks**

1. Describe briefly the two type's substitution matrices.
2. What is the difference between Distance, Parsimony, and Maximum likelihood?
3. Give the reasons why protein searches are faster and more sensitive than DNA searches.
4. Explain PAUP. Explain tree building and tree evaluation in PAUP.
5. Explain and draw the flow chart for deciding which protocol to follow for DNA sequence submission to one of the DNA sequence databases.
6. Discuss how the pI/MW and peptide Mass of a protein can be computed?
7. Discuss Substitution score and Gap Penalties.