

Reg. No. :

D 1714

Q.P. Code : [D 07 PBI 01]

(For the candidates admitted from 2007 onwards)

M.Sc. DEGREE EXAMINATION, DECEMBER 2010.

First Year

Bioinformatics

FUNDAMENTALS OF BIOLOGICAL SYSTEMS

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

All questions carry equal marks.

(5 × 20 = 100)

1. Explain various mechanisms of transport of ions across plasma membrane.
2. Describe the structure of prokaryotic and eukaryotic cells with neat diagrams.
3. Describe the double helical structure of DNA.
4. Explain the different types of isomers in carbohydrates.

5. Explain the mechanism of carbon dioxide fixation by Calvin pathway.
6. Give a detailed account on coenzymes and metal cofactors.
7. Explain in detail the mechanism of enzyme action.
8. Explain the mechanism of DNA replication.

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M.Sc. DEGREE EXAMINATION, DECEMBER 2010.

First Year

Bioinformatics

COMPUTATIONAL METHODS FOR SEQUENCE
ANALYSIS

Time : Three hours

Maximum : 100 marks

SECTION A

Answer any FIVE questions.

(5 × 20 = 100)

1. Give a brief account on various available biological databases, data formats.
2. Compare and contrast the PAM and BLOSUM in mutation analysis between two homologous DNA sequences.
3. Explain the strategies of Bootstrapping in the evolutionary analysis of different organisms.

4. How will you proceed with the identification of regulatory regions in prokaryotic and eukaryotic genes?
5. Describe the concepts and secondary structure prediction of RNA using HMM.
6. Discuss the methodology, significant advantages and disadvantages of dot plot.
7. Highlight the applications of bioinformatics in various fields.
8. Write brief notes on rooted and unrooted tree representation in evolutionary analysis of different organisms.

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First Year

Bioinformatics

PROGRAMMING IN C AND PERL

Time : Three hours

Maximum : 100 marks

Carefully read the questions.

Write the program code wherever necessary.

Answer any FIVE questions.

All questions carry equal marks.

(5 × 20 = 100)

1. Explain in detail about the following with suitable examples.
 - (a) Keywords and identifiers
 - (b) Rules for naming the variables
 - (c) Symbolic constant
 - (d) Data types and qualifiers.

2. Describe in detail about the different looping statements available in C, with suitable example programs.
3. Write a simple C program to calculate the different arithmetic functions using switch-case statement.
4. Write a C program to calculate the average of given marks of n students using function.
5. Write the syntax for declaration of one and two dimensional arrays in C. Write a C program to find the addition of given two matrices.
6. Write syntax for opening, updating and closing a file in C. Discuss about the command line arguments in C.
7. Discuss in detail about the different operators used in Perl. Explain the Hashes and Lists with suitable example.
8. What is regular expression? Write any five regular expression symbols and describe their uses in pattern matching.

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M.Sc. DEGREE EXAMINATION, DECEMBER 2010.

First Year

Bioinformatics

MOLECULAR INTERACTIONS

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions out of Eight.

(5 × 20 = 100 marks)

1. (a) Explain linear combination of atomic orbitals. (5)
- (b) Write a note on resonance structures. (15)
2. Explain VSEPR theory with suitable examples.
3. Discuss in detail
 - (a) principle and significance of protein folding (9)
 - (b) hydrophobic interactions (4)

- (c) beta turns (4)
- (d) disulphide bridges (3)
4. (a) Write a detailed note on metallo proteins. (12)
- (b) Explain DNA-protein interactions. (8)
5. Define :
- (a) chemical shift
- (b) condition and selection rule of IR
- (c) auxochrome and chromophore
- (d) Beer-Lambert's law
- (e) Circular dichroism (5 × 4 = 20)
6. (a) Write the applications of CD to macromolecules. (10)
- (b) Explain the principle of NMR spectroscopy. (10)
7. (a) Write a note on valence bond theory. (10)
- (b) Explain the formation and stability of electrovalent bond. (10)

8. Explain :

- (a) non-banded interactions
- (b) type of helices
- (c) partial ionic character of covalent bonds
- (d) vander waals forces. (4 × 5 = 20)

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D 1717

Q.P. Code : [DO 7 PBI 05]

(For the candidates admitted from 2007 onwards)

M.Sc. DEGREE EXAMINATION, DECEMBER 2010.

Second Year

Bioinformatics

GENOMICS AND PROTEOMICS

Time : Three hours

Maximum : 100 marks

Answer any FIVE of the following questions.

(5 × 20 = 100)

1. Describe the gene prediction approaches.
2. How will you perform genome analysis? Describe the tools.
3. Give an account of the approaches to Gene Expression analysis.
4. Illustrate how you will analyse expression and regulation of entire set of genes.

5. Describe the methods of comparative genomics.
6. Describe the softwares employed to analyse protein structures.
7. Discuss the Molecular Modelling Databases that are available to you.
8. Discuss the means of experimentally analysing proteins in a laboratory.

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M.Sc. DEGREE EXAMINATION, DECEMBER 2010.

Second Year

Bio-informatics

SYSTEMS BIOLOGY

Time : Three hours

Maximum : 100 marks

Answer any FIVE of the following questions.

(5 × 20 = 100)

1. Throw light on the integration of the biochemical networking of a cell.
2. Explain the applications of microarray analysis
3. Discuss the metabolome of an organism with a suitable illustration.
4. How will you translate the biochemical networks into linear algebra?
5. Explain the principles and advantages of whole cell simulation studies.

6. Describe the types and relationship exhibited in protein-ligand binding events.
7. How are macromolecular associations/interactions predicted?
8. Explain the gene discovery process.

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Second Year

Bioinformatics

PROGRAMMING IN VISUAL BASIC WITH RDBMS

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

(5 × 20 = 100)

1. Describe in detail about the schemes of E-R models.
2. Explain about application of Network Data Model and Hierarchical Data Model.
3. Discuss in detail about the different data definition languages.

4. Explain in detail about the following Visual Basic concepts with a suitable example :
 - (a) Data types
 - (b) Strings
 - (c) Constants
 - (d) Data arrays.
5. What is looping statement? Explain the looping statements of Visual Basic.
6. Write a suitable program using different types of boxes available in Visual Basic.
7. Describe in detail about the data connectivity and explain how it is achieved in Visual Basic.
8. Write short notes on :
 - (a) VB scripting and
 - (b) ASP and its applications.

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Second Year

Bio-informatics

MOLECULAR MODELLING AND COMPUTER
AIDED DRUG DESIGN

Time : Three hours

Maximum : 100 marks

Answer any FIVE questions.

(5 × 20 = 100)

1. Write notes on molecular structure, internal energy and molecular graphics.
2. Explain Hartee Fock equations and its role in molecular modelling.
3. Discuss the principles and applications of molecular modelling.
4. Explain bond stretching, angle bending and non-bonded interactions.

5. Give a detailed account on energy minimization methods and applications.
6. Discuss about the methods of molecular dynamic simulation.
7. Give a detailed account on SAR and QSAR studies and their implications.
8. Explain the structure based drug design for all classes of targets.