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VH—03—2024

FACULTY OF SCIENCE

B.Sc. (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(New Course)

BIOINFORMATICS

Paper-CCBI-1C

(Molecular Biology)

(Tuesday, 26-11-2024)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

1. Describe in detail about DNA Repair mechanism. 15

Or

(a) Write a note on Cot curve. 8

(b) Explain importance of Helicase enzyme in replication. 7

2. Describe in detail about Co & Post-transcriptional modification in m-RNA. 15

Or

(a) Write a note on Upstream and downstream promoters. 8

(b) Explain the term : Role of sigma factor. 7

P.T.O.

WT

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3. Describe in detail about Co & post-translational modifications in proteins. 15

Or

- (a) Write a note on Heat shock proteins. 8
- (b) Explain the term : Chaperons and Chaperonins. 7
4. Describe in detail about types of operon trp and their mechanism. 15

Or

- (a) Write a note on properties of genetic code. 8
- (b) Define and explain the term : RNA. 7
5. Write short notes on (any *three*) : 15
- (a) Ligase enzyme
- (b) SOS repair
- (c) Properties of DNA
- (d) Exon
- (e) 5' Capping.

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FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(New Pattern)

BIOINFORMATICS

Paper DSCBI-4C

(Advance Bio-programming)

Tuesday, 3-12-2024)

Time : 2.00 p.m. to 5.00 p.m.

Time—Three Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Attempt all questions with examples.

1. What is Python ? What are its features ? Elaborate on comparison of Python with other languages. 15

Or

(a) How to install Python on Windows ? 8

(b) Explain basic input, output and mathematical operation in Python. 7

2. What are python list and tuple ? Explain difference between list and tuple. 15

Or

(a) Differentiate among 'if', 'elif' and 'else' statements in Python. Provide examples. 8

(b) Explain the use of switch statement in Python with example. 7

P.T.O.

3. What is the importance of looping ? How does 'for' loop differ from 'while' loop in Python ? Provide examples of both. 15

Or

- (a) What is the purpose of 'pass' statement in Python ? Provide an example. 8
- (b) Describe use of the 'try', 'except', 'else' and 'finally' blocks in Python for exception handling. Provide examples. 7
4. Describe the purpose and use of classes and objects in Python. Provide a simple example of a class and object. 15

Or

- (a) Explain excapsulation. Provide examples. 8
- (b) How to create and call Python function ? Provide example. 7
5. Write short notes on (any *three*) : 3×5=15
- (a) RegEx
- (b) Biopython
- (c) RegEx in bioinformatics
- (d) Python modules
- (e) File handling in Python.

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VH—08—2024

FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(New Pattern)

BIOINFORMATICS

Paper CCBI-2C

(Biodiversity and Phylogenetics)

(Thursday, 28-11-2024)

Time : 2.00 p.m. to 5.00 p.m.

Time—Three Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) Draw diagram and schemes wherever necessary.

1. What is Biodiversity ? Describe in detail levels of biodiversity. 15

Or

(a) Describe “India as megadiversity nation”. 8

(b) Write a note on diversity informatics in India. 7

2. Discuss in detail hotspots of biodiversity. 15

Or

(a) Write a note on GBIF and Species 2000. 8

(b) Write a note on ICTV. 7

P.T.O.

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3. Write in detail about species identification. 15

Or

(a) Write a note on ITIS and DELTA. 8

(b) Discuss metadata and metadata standards. 7

4. What is Molecular Phylogenetics ? Add a note on phylogenetic terms. 15

Or

(a) Discuss about phylogenetic trees. 8

(b) Write a note on MSA. 7

5. Write short notes on (any *three*) : 3×5=15

(a) Tree of life

(b) UPGMA

(c) Character based methods

(d) Models of evolution

(e) Biodiversity informatics.

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VH—14—2024

FACULTY OF SCIENCE

B.Sc. (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(New Pattern)

BIOINFORMATICS

(Bioprogramming Using C)

(Saturday, 30-11-2024)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Write program wherever necessary.

1. Explain C instruction in detail with example. 15

Or

(a) Explain in details console I/O functions in C language. 8

(b) What are Variables ? Explain types of variable. 7

2. Describe decision-making statement in C language. 15

Or

(a) Explain file I/O functions in C language. 8

(b) Describe pointer to function in C language with example. 7

P.T.O.

3. Describe looping statement in C language with example. 15

Or

(a) Describe standard library string function with example. 8

(b) Explain hierarchy of operations in C language. 7

4. Write in detail about functions in C language. 15

Or

(a) What is array ? Explain array types with example. 8

(b) Describe difference between structure and union. 7

5. Write short notes on (any *three*) : 15

(a) Variables and keywords

(b) Describe union

(c) Structure

(d) Break Statement

(e) Storage class.

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FACULTY OF SCIENCE

B.Sc. (Second Year) (Third Semester) EXAMINATION

NOVEMBER/DECEMBER, 2024

(New Course)

BIOINFORMATICS

(Biostatistics)

(Tuesday, 03-12-2024)

Time : 2.00 p.m. to 5.00 p.m.

Time—3 Hours

Maximum Marks—75

N.B. :— (i) All questions are compulsory.

(ii) All questions carry equal marks.

(iii) Draw well labeled diagrams wherever necessary.

1. (a) Define central tendency. Compute arithmetic mean for the following data (ungrouped) : 8

Data = 12, 15, 17, 22, 25, 28, 30

(b) Calculate the median and mode for the following data : 7

C.I.	Frequency
10—20	05
20—30	08
30—40	10
40—50	07
50—60	03

P.T.O.

Or

- (a) Define variance. Compute it for the following data : 8

6, 8, 10, 12, 14

- (b) Explain the concept of weighted arithmetic mean and calculate it for the following data : 7

Item	Value	Weight
A	50	3
B	70	5
C	90	2

2. (a) State and prove Bay's theorem. 8

- (b) If $P(A) = 0.4$, $P(B) = 0.5$ and $P(A) \cap (B) = 0.2$, then calculate 7

(i) $P(A) \cup (B)$.

(ii) $P(A|B)$

Or

- (c) Find the inverse of the following matrix :

$$\begin{bmatrix} 2 & 3 \\ 1 & 4 \end{bmatrix}.$$

8

- (d) Define complex numbers with examples. 7

3. (a) Differentiate between continuous and discrete data with example. 8
- (b) Draw pie-chart for the following data : 7

Category	Frequency
A	30
B	25
C	20
D	15

Or

- (c) Explain the concept of standard deviation with example. 8
- (d) Calculate the range for the following data : 7
- 7, 8, 10, 15, 20, 25, 30, 35
4. (a) Define set operations. Illustrate the following : 8
- $A = \{1, 2, 3, 4\}$, $B = \{3, 4, 5, 6\}$.
- (b) Solve the problem involving the union of 3 sets. 7

Or

- (c) Find the limit of the following sequence :

$$n \rightarrow \infty : \frac{n}{n+1} \quad 8$$

- (d) Prove that fibonacci sequence follows a recurrence relation. 7

P.T.O.

WT

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5. Write short notes on (any *three*) : 15

(a) Co-efficient of variance

(b) Histogram

(c) Frequency curve

(d) Range

(e) Weighted mean

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