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14 (SEM-1) ZOO 1024

2024

ZOOLOGY

Paper : ZOO-1024

(Bioinformatics and Instrumentation)

Full Marks : 20

Time : One hour

The figures in the margin indicate full marks for the questions.

Unit-I

1. Write short notes on the following: 3+3=6

- (a) Smith-Waterman method of local alignment for a pair of sequences
- (b) Distance-based tree building method : UPGMA (Unweighted pair group method using arithmetic mean)

2. Answer **any two** questions : 7×2=14

- (a) Describe the computational methods for protein tertiary structure prediction. Name few online tools available for protein structure prediction.

Contd.

(b) Using Needleman and Wunsch dynamic programming method, construct alignment score table for the following two sequences, using the following scoring parameters :

match score : +5,

mismatch score : -1,

gap penalty : -2

AGT

AAGC

Write down the optimal global alignment between the two sequences.

(c) What is a phylogenetic tree? Explain the steps of UPGMA method to construct a phylogenetic tree given in the following distance matrix :

	A	B	C	D	E	F
A	0	1	3	6	7	10
B	1	0	3	6	7	10
C	3	3	0	5	6	9
D	6	6	5	0	1	7
E	7	7	6	1	0	8
F	10	10	9	7	8	0

Unit-II

Full Marks : 20

Time : One hour

Question Number 1 is compulsory and answer any two questions from the rest.

What is the purpose of pulsed field gel electrophoresis? What is the mechanism of PFGE? How can PFGE be used to genotype microorganisms?
1+2+3=6

What is an ELISA (enzyme-linked immunosorbent assay)? Compare the principles and detection methods of direct, indirect and sandwich ELISA.
1+6=7

3. What is the principle of HPLC? What are the different components of HPLC? What is the difference between normal phase chromatography (NPC) and reverse phase chromatography (RPC)? What are the different types of detectors used in HPLC?
1+2+2+2=7

4. What is autoradiography? How does autoradiography work? How is the image created? How can autoradiography be used to detect mutated genes?
1+3+1+2=7