

LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.Sc. DEGREE EXAMINATION – MATHEMATICS

THIRD SEMESTER – NOVEMBER 2007

MT 3875 - MATHEMATICAL METHODS IN BIOLOGY

AB28

Date : 01/11/2007
Time : 9:00 - 12:00

Dept. No.

Max. : 100 Marks

I a) Define Accession number and Algorithm.

(or)

b) What do you mean by DNA sequence. (5)

c) Give an account on Operating system.

(or)

d) Briefly describe the Phylogenetic tree. (15)

II a) Explain briefly Metallothionein and add a note with Multiple Alignment.

(or)

b) Define Amino acid with the biomath perspective. (5)

c) Describe the various application aspects of Bio informatics.

(or)

d) Explain the usage of Internet. (15)

III a) a) Draw the state diagram for $M = \{ (q_0, q_1, q_2, q_3), \{0,1\}, \delta, q_0, \{q_0\} \}$

δ	0	1
q_0	q_0	q_1
q_1	q_2, q_3	q_2
q_2	-	q_3
q_3	q_3	q_1, q_2

(or)

b) Define Local alignment problem with an example. (5)

c) When both i and j are strictly positive, prove that

$$D(i,j) = \min [D(i-1,j)+1, D(i,j-1)+1, D(i-1,j-1)+t(i,j)]$$

(or)

d) Write notes on the first information age in biology. (15)

IV a) Define edit transcript and edit distance and explain how is the transformation between two strings vintner to writers by applying the edit operations 'RIMDMDMI'.

(or)

b) Construct a deterministic finite automata accepting words over $\{0,1\}$ ending with '10'. (5)

c) Write notes on Bottom up computation and trace back for recurrence methods.

(or)

d) Explaining the role of computing in modern biology? (15)

V a) What challenges does biology offer to computer scientists.

(or)

b) What are software and information available for us biological research? (5)

c) Describe the salient features of Human Genome project.

(or)

d) For $i>0$ and $j>0$, the proper recurrence for $v(i,j)$ is

$$v(i,j) = \max [0, v(i-1,j-1) + s(S_1(i) , S_2(j)), v(i-1,j) + s(S_1(i) , -), v(i,j-1) + s(- , S_2(j))] \quad (15)$$
