2012
M.Sc.
3rd SEMESTER EXAMINATION
COMPUTER SCIENCE
PAPER—COS—304
Full Marks : 50
Time : 2 Hours

The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable.
Illustrate the answers wherever necessary.

ELECTIVE – I

(Bio-Informatics)

Answer Q. No. 1 any three from the rest.

1. Answer any four :  $4 \times 2 \frac{1}{2}$

(a) Sequence alignment;
(b) FASTA format;
(c) Promoter region;
(d) TSS;
(e) Data Mining;
(f) z-score method.

(Turn Over)
2. (a) What do you understand by central dogma of molecular biology?

(b) What do you understand by primary, secondary and tertiary structures of proteins?

(c) What are the main sequence level tasks in bioinformatics?  

4+3+3

3. Globally align the following two DNA sequences using a dynamic programming algorithm.

*Sequence 1: CATACGA;*

*Sequence 2: GAATCA*

Take linear gap penalty as \(-6/\text{gap}\) and use the following substitution matrix:

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Compute the optimal global alignment score and report the all possible optimal alignments.
4. (a) How many essential amino acids are in protein.  
(b) Write down the chemical structure and three letter symbols of the following essential amino-acids;
   (i) Glutamic acid;
   (ii) Tryptophan;
   (iii) Phenylalanine.

5. (a) Write down the difference between local alignment and global alignment with example.  
(b) What is α-helical and β-sheet structure in protein?  
(c) What do you mean by SP/P00440?  
(d) Describe TATA box.  
(e) What is gene?  

6. (a) Explain the Pattern recognition and discovery process in detail.  
(b) Draw a dot plot of the following sequence from the what dwarf virus genome.

   tttcgtgagtgcgcggaggtttt against itself.

In what respects is it not a Perfect Palindrome.

[Internal Assessment — 10 Marks]
(Mobile Computing)

Answer any four questions.

1. (a) What is the function of AUC? 2
   
   (b) Write the major function of BSS of GSM architecture. 3
   
   (c) Write the major disadvantage of wireless networking. 3
   
   (d) What is SIM? 2

2. (a) Briefly explain with diagram how CDMA system works. 5
   
   (b) Define ASK and FSK. Give their utility. $2\frac{1}{2} \times 2$

3. (a) Define mobile IP. Explain how mobile IP works. 2+3
   
   (b) What is frequency hoping? 2
   
   (c) Define reverse tunneling process briefly. 3
4. (a) What is DHCP?

(b) What is wireless LAN?

(c) Prove that

\[ r = \left( \frac{g \cdot R^2}{(2\pi f)^2} \right)^{\frac{1}{3}} \]

Where—

R is the radius of earth, \( m \) is the mass of the satellite, \( r \) is the distance of the satellite to the centre of earth, \( g \) is the acceleration of gravity, \( f \) is the frequency of the rotation.

5. (a) Write system architecture of “IEEE 802.11” protocol.

(b) What is IMEI and IMSI.

(c) What is Modulation process? What are the major type of modulation. Explain any one of them.

6. (a) Write short notes of the followings:

(i) Near and far problem.

(ii) GSM.

(iii) Orthogonal frequency division multiplexing.
(b) What is Wireless Application Protocol?

(c) What is multipath propagation?

[Internal Assessment — 10 Marks]