# 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* : $4\times2\frac{1}{2}$

(a) Sequence alignment;

(b) FASTA format;

(c) Promoter region;

(d) TSS;

(e) Data Mining;

(f) z-score method.

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/gap and use the following substitution matrix :

| | A | C | G | T |
|---|---|---|---|---|
| A | 6 | -8 | 2 | -8 |
| C | -8 | 6 | -8 | 2 |
| G | 2 | -8 | 6 | -8 |
| T | -8 | 2 | -8 | 6 |

   Compute the optimal global alignment score and report the all possible optimal alignments.

   10

**4.** (a) How many essential amino acids are in protein. 1

(b) Write down the chemical structure and three letter symbols of the following essential amino-acids;

(i) Glutamic acid;

(ii) Tryptophan;

(iii) Phenylalanine.

3×3

**5.** (a) Write down the difference between local alignment and global allignment with example. 3

(b) What is $\alpha$-helical and $\beta$-sheet structure in protein ? 3

(c) What do you mean by SP/P00440 ? 1

(d) Describe TATA box. 2

(e) What is gene ? 1

**6.** (a) Explain the Pattern recognition and discovery process in detail. 3

(b) Draw a dot plot of the following sequence from the what dwarf virus genome.

ttttcgtgagtgcgcggaggctttt against itself.

In what respects is it not a Perfect Palindrome. 7

***[ 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? 2

(b) What is wireless LAN? 3

(c) Prove that

$$r = \left(g.R^2 / (2\pi f)^2\right)^{1/3}$$

Where—

R is the radious of earth, m is the mass of the satelite, r is the distance of the satelite to the centre of earth, g is the acceleration of gravity, f is the frequency of the rotation.

5

**5.** (a) Write system architecture of "IEEE 802.11" protocol. 4

(b) What is IMEI and IMSI. $1\frac{1}{2} \times 2$

(c) What is Modulation process ? What are the major type of modulation. Explain any one of them. 3

**6.** (a) Write short notes of the followings : $3 \times 2$

(i) Near and far problem.

(ii) GSM.

(iii) Orthogonal frequency division multiplexing.

(b) What is Wireless Application Protocol ? 2

(c) What is multipath propagation ? 2

***[ Internal Assessment — 10 Marks ]***

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