

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VIII • EXAMINATION – SUMMER 2013****Subject Code: 180305****Date: 09-05-2013****Subject Name: Bioinformatics****Time: 10.30 am - 01.00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Define the following terms; **07**
(i) Genomics, (ii) Transcriptomics, (iii) Proteomics
(iv) Metabolomics (v) Cheminformatics (vi) Glycomics
(vii) Pharmacogenomics

(b) Explain the classification schema of biological databases based on **07**
(i) Data type, (ii) Maintainer status, (iii) Data access, (iv) Data source,
(v) Database design and (vi) type of organism.

Q.2 (a) Explain the data submission tools available at EMBL. **07**

(b) Write a program to input two DNA sequences and concatenate the **07**
sequences.

OR

(b) Write a program to calculate and display the AT and GC content of input **07**
sequence.

Q.3 (a) What is sequence alignment? Compare between the *Needleman-Wunsch* **07**
and *Smith-Waterman* algorithm.

(b) Explain Multiple Sequence Alignment and list its applications. **07**

OR

Q.3 (a) What is gene annotation? Explain the need for gene annotation. **07**

(b) List the advantages and disadvantages of various computational gene **07**
prediction methods.

Q.4 (a) What is meant by the secondary structure of proteins? Explain α -helix and **07**
 β -strands forms of protein structures.

(b) Explain the limitation of protein secondary structure prediction. **07**

OR

Q.4 (a) List the application of HMM in bioinformatics and explain the gene finding **07**
application using HMM.

Q.4 (b) Explain Monte Carlo method to compute pathway and thermodynamics **07**
properties of bio-molecules.

Q.5 (a) What are the different computational methods available for energy **07**
minimization? Explain any one first derivative method.

(b) Explain the four levels of protein structure. **07**

OR

Q.5 (a) Compare FASTA and BLAST method for database searching. **07**

(b) What is a PAM matrix? When it is generated? Briefly state the sources of **07**
error in PAM model.
