Seat No.: _____ Enrolment No._____

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; (i) Genomics, (ii) Transcriptomics, (iii) Proteomics (iv) Metabolomics (v) Cheminformatics (vi) Glycomics (vii) Pharmacogenomics	**07**
	(b)	Explain the classification schema of biological databases based on (i) Data type, (ii) Maintainer status, (iii) Data access, (iv) Data source, (v) Database design and (vi) type of organism.	**07**
Q.2	**(a)**	Explain the data submission tools available at EMBL.	**07**
	(b)	Write a program to input two DNA sequences and concatenate the sequences.	**07**
		OR	
	(b)	Write a program to calculate and display the AT and GC content of input sequence.	**07**
Q.3	**(a)**	What is sequence alignment? Compare between the *Needleman-Wunsch* and *Smith-Waterman* algorithm.	**07**
	(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 prediction methods.	**07**
Q.4	**(a)**	What is meant by the secondary structure of proteins? Explain Ŭ-helix and ϐ-strands forms of protein structures.	**07**
	(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 application using HMM.	**07**
Q.4	**(b)**	Explain Monte Carlo method to compute pathway and thermodynamics properties of bio-molecules.	**07**
Q.5	**(a)**	What are the different computational methods available for energy minimization? Explain any one first derivative method.	**07**
	(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 error in PAM model.	**07**

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