

GUJARAT TECHNOLOGICAL UNIVERSITY**B.E. - SEMESTER – VIII EXAMINATION – OCTOBER 2012****Subject code: 180305****Date: 25/10/2012****Subject Name: Bioinformatics****Time: 02.30pm - 05.00pm****Total Marks: 70****Instructions:**

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

Q.1 (a) What is gene? Mention the major parts of a typical eukaryotic gene. **07**

(b) What the major steps involved in central dogma? **07**

Q.2 (a) What is database? Why does one need a biological database? **07**

(b) How do you classify bio-databases based on their source of data? **07**

OR

(b) Write PERL program to read a DNA sequence from a file and then ask the user to enter the query sequence and then look the query in the DNA sequence file. **07**

Q.3 (a) What is the role of accession code in sequence database? **07**

(b) What is BLOSUM? Describe how a frequency table is made from database of blocks. **07**

OR

Q.3 (a) What are the difference between similarity and homology? What is gap? **07**

(b) What is gene annotation? Explain the need for gene annotation. **07**

Q.4 (a) Mention the difference between content sensor and signal sensor. **07**

(b) How do prokaryotic promoters help in detection of CDS? **07**

OR

Q.4 (a) How are the processes of energy minimization and molecular dynamics useful in the prediction of protein structure? **07**

Q.4 (b) What is meant by the secondary structure of proteins? Sketch α -helix and β -sheet. **07**

Q.5 (a) Show how amino acids join up to form a peptide unit in a polypeptide chain. Identify the angles ϕ and ψ . **07**

(b) How is the bonding interaction energy between two atoms separated by a distance R and with an ideal bond distance R_0 , represented mathematically? **07**

OR

Q.5 (a) What are the fundamental differences between Steepest descent and Newton-Raphson minimization techniques? **07**

(b) What are the advantages and limitations of Hidden Markov Model Software? **07**
