Unique Paper Code	:	32237905
Name of the Paper	:	DSE Computational Biology
Name of the Course	:	B.Sc. (H) Zoology Examination, 2021 - LOCF
Semester	:	Semester – V, Theory Examination
Duration	:	3 Hours
Maximum Marks	:	75

Instructions for Candidates:

Attempt any *four* questions. All questions carry equal marks.

Q1. An undergraduate science teacher wants to organise a workshop for her students on 'Drug Designing & Development'. In this respect, she is planning the modules of the workshop in which the students would be able to understand that a drug is an effective ligand for a protein of therapeutic interest. So, you have to assist the teacher in finalising the modules for this workshop, wherein you discuss the modules in a stepwise manner. Elaborate your answer using suitable diagrams or flowcharts.

(18.75)

Q2. "Biological databases play a crucial role in biological discoveries and are classified based on the data".Justify the statement with suitable examples.

(18.75)

Q3. A student was analysing the results obtained from pairwise sequence alignment of two protein as well as two respective nucleotide sequences. He found few '+' signs in case of protein sequence alignment, while these signs were not present in case of nucleotide sequence alignment. State the possible reasons for such difference in results and also explain the scoring matrices which were used for scoring the protein sequence alignment.

(18.75)

Q4. What do you understand by the statement, "By the order of nucleotides or amino acids, sequence in DNA or protein can be determined respectively". Explain any one method by which we can deduce the order of nucleotides and amino acids respectively. (18.75)

Q5. "Bioinformatics is a subject of multidisciplinary approach with multiple applications". Justify the statement with suitable examples. (18.75)

Q6. In a dihybrid cross with two traits (9:3:3:1), the following data (with respect to the number of offspring with different genotypes) was obtained:

- Dominant for both traits: 576,
- Dominant for trait 1 and Recessive for trait 2: 191
- Dominant for trait 2 and Recessive for trait 1: 181
- Recessive for both traits: 52

Perform a chi-square analysis to see if the data given above agrees with the predictedoutcome of this cross. State the null and alternate hypothesis as well as degrees offreedom used and explain your results in detail (Take α =0.05). Also, find out if you have made an error, would it be a Type I or a Type II error? Explain your answer.

(18.75)