NPTEL 2024 Assignment Questions
Bioinformatics: Algorithms and Applications

Week 7

1. The free energy change between folded and unfolded states of a protein is in the range of
   a. 0-5 kcal/mol
   b. 5-25 kcal/mol
   c. 50-100 kcal/mol
   d. 100-500 kcal/mol
2. Which of the following method is used for measuring the folding free energy?
   a. Circular dichroism
   b. Isothermal calorimetry
   c. X-ray crystallography
   d. All of these
3. Side chain modelling is generally performed using
   a. Available rotamer libraries
   b. Random search
   c. Systematic search
   d. None of the above
4. Comparing solid, liquid and gas, which medium has the minimum entropy?
   a. Solid
   b. Liquid
   c. Gas
   d. All the states have the same entropy

5. PDBparam provides information on
   a. Protein 3D structure based parameters
   b. Protein sequence based parameters
   c. DNA 3D structure based parameters
   d. DNA sequence based parameters
6. The amount of heat used or released in a system at constant pressure is termed as _____
   a. Internal Energy
   b. Volume
   c. Enthalpy
   d. Entropy
7. What is the nature of a process when the value of ΔG (Gibbs free energy) is positive?
   a. Spontaneous
   b. Non-Spontaneous
   c. Equilibrated
   d. None of the above
8. Hydrophobic free energy is related to _____
   a. Contact between amino acid residues
   b. Solvent accessibility
   c. Center of mass

d. Relative mutability

9. If N-H…O forms a hydrogen bond, identify the hydrogen bond donor:
   a. N
   b. H
   c. O
   d. N-H
10. Consider atomic mass for C, N and O as 12, 14 and 16, respectively, what is the center of mass for Gly with the following X, Y and Z coordinates?

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                                                  X      Y      Z
ATOM   457  N    GLY A  58                      6.3    4.5    8.7
ATOM   458  CA   GLY A  58                      6.1    3.5    8.6
ATOM   459  C    GLY A  58                      7.4    2.8    9.1
ATOM   460  O    GLY A  58                      7.4    1.6    9.5
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   a. 6.8, 3.0, 9.0
   b. 6.8, 2.8 and 8.0
   c. 7.1, 2.1 and 7.8
   d. 6.5, 2.5 and 6.2