LS2103.   Class Test-2.   24.10.2024   Time: 20 MINUTES.
Clearly tick ONLY ONE OPTION (*single right answer*).   Use back page for any rough work.
***Negative marks for wrong/ambiguous selection*.**

1. Consider a protein system that can occupy one "active" (named A) state, and three different "inactive" (named I_1, I_2, I_3) states. The *disorder* (or entropy) will be zero when:

a) I_1, I_2 and I_3 are identical

b) 'A' is the only occupied state

c) All four states are uniformly occupied

d) Temperature is elevated by 10 K

2. A large number of protein molecules are tagged and their movements are monitored over a total time, T.

a) The mean distance covered increases with protein size

b) The distances covered should follow a Gaussian distribution centered at 0

c) The squared distances covered should follow a Gaussian distribution centered at 0

d) Only the positions of the protein molecules with time are required for estimating the diffusion coefficient

3. At a constant temperature, the diffusivity of free particles in a particular solvent medium is:

a) Proportional to the viscous friction coefficient of the medium

b) Proportional to the temperature

c) Independent of thermal conditions

d) Dependent on number of particles

4. The Stokes-Einstein relationship:

a) Connects medium viscosity and particle diffusivity at constant temperature

b) Is disconnected to the spatial dimensions

c) Is disconnected to the movement of individual particles

d) Connects medium viscosity and particle diffusivity at constant pressure

5. A large amino acid sequence (ie. a protein) emerges from the ribosome as a disordered chain. It takes some time to acquire the functionally folded form.

a) The final end-to-end distances are all identical

b) The final end-to-end distances obey a Normal distribution

c) The final, mean squared end-to-end distances are independent of the number of amino acids

d) The amino acids are assumed to be connected with highly non-uniform bonds