LS2103.   Class Test-5.   21.11.2024   Time: 15 MINUTES.
Clearly tick ONLY ONE OPTION (*single right answer*).   Use back page for any rough work.
***Negative marks for wrong/ambiguous selection*.**

1. A large protein complex, made up of 'N' subunits held together, was studied. The individual sedimentation coefficient for each subunit (s_i) and complex (s_{com}) obeyed the relationship:

a) $s_{com} > \sum_{i=1}^{N} s_i$

b) $s_{com} \geq \sum_{i=1}^{N} s_i$

c) $s_{com} < \sum_{i=1}^{N} s_i$

d) $s_{com} \leq \sum_{i=1}^{N} s_i$

e) $s_{com} \propto \sum_{i=1}^{N} s_i$

2. Flagella are able to create local turbulence in water, *and* propel forward. This is possible due to:

a)   Greater viscous coefficient in the direction perpendicular to the flagella axis

b)   Lesser viscous coefficient in the direction perpendicular to the flagella axis

c)   Presence of laminar fluid flow inside the flagella tube

d)   Presence of turbulent flow inside the flagella tube

e)   Flexibility of the flagella tube

3. The free energy cost of solvating a hydrophobic droplet into water is directly dependent on:

a)   Molar mass of the droplet

b)   Shape of the droplet

c)   Chemical composition of the droplet

d)   Surface tension of water

e)   Temperature of water

4.   The magnitudes of activation energies, of the same internal-protein hydrogen bond, is determined experimentally in vacuum ($E_a^{(vac)}$); in water ($E_a^{(wat)}$); and in a non-polar organic solvent ($E_a^{(sol)}$). Select the correct option:

a) $E_a^{(vac)} > E_a^{(wat)} > E_a^{(sol)}$

b) $E_a^{(vac)} < E_a^{(wat)} < E_a^{(sol)}$

c) $E_a^{(vac)} < (E_a^{(wat)} \approx E_a^{(sol)})$

d) $E_a^{(vac)} < E_a^{(wat)} > E_a^{(sol)}$

e) $(E_a^{(vac)} \approx E_a^{(sol)}) > E_a^{(wat)}$