

NAME:

ROLL NO:

LS2103. Class Test-4. 16.11.2024 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. An electrophysiology experiment is set up to measure the potential difference (ΔV) across a biological membrane partitioning a particular kind of ion concentration (of charge q) across it, at temperature T .

- a) The concentration ratio scales as the natural logarithm of $(1/k_B T)$.
- b) A plot of the concentration ratio with $(1/T)$ is independent of the charge
- c) For a fixed concentration ratio, the potential difference will directly scale with the temperature.
- d) The ion diffusion coefficient influences the concentration ratio.

2. Glycerin is placed between two circular plates separated by 5 cm. An ink drop of diameter 2 mm is injected at the centre. The circular plates are stirred, first clockwise, and then anti-clockwise. The ink blob is found to re-form at the end. What are the reasons?

- a) The viscosity in the medium is lowered due to the applied force.
- b) The very low diffusivity of the ink molecules in the highly viscous medium.
- c) The system is moved out of equilibrium due to the force.
- d) The low distance between the plates.

3. The transition from laminar to turbulent flow can be brought about by:

- a) Reducing the inertial forces
- b) Reducing the particle mass by 10%
- c) Enhancing the particle mass by 10%
- d) Enhancing the inertial forces

4. A student is handed a suspension in a 24 cm tall lab cylinder. The continuum phase is a thermally stable organic solvent, and it contains a variety of particles. Thereby, the student finds a distribution of scale heights at room temperature. What should he expect if the temperature is gradually increased?

- a) The distribution becomes uni-modal.
- b) The distribution becomes flat.
- c) The distribution shifts towards the left.
- d) The distribution shifts towards the right.