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of diffusion constant in the velocity space using the Langevin expression. $3\frac{1}{2} + 3 + 3\frac{1}{2}$

Unit: P-4152

3. Answer *any four* questions. 4×5
- Discuss the causes and effects of protein denaturation. What is the role of molecular chaperone when a protein gets denatured?
 - Describe with illustration the double helix structure of DNA. Why melting temperature of DNA increases in presence of salt?
 - What is carrier mediated passive transport? – Give an example. How does it differ from simple diffusion?
 - Discuss the mechanism of synaptic nerve conduction. In which condition total paralysis is the result – i) Na-channel is blocked or ii) K-channel is blocked? Explain why.
 - What is stacking interaction? On which factors does stacking depend? Why heparin is more effective than DNA to stack dye molecules?
 - What is the role of myosin and Ca^{2+} ions in muscle contraction?

Ex/SC/CHEM/PG/CORE/TH/XV-P/2023

M. Sc. (CHEMISTRY) EXAMINATION, 2023

(4th Semester)

PAPER: XV–P

[PHYSICAL CHEMISTRY SPECIAL]

Time : Two Hours

Full Marks : 40

(20 marks for each unit)

Use a separate answer script for each unit.

Unit: P-4151

- Describe the essential assumptions made by Einstein to formulate the Brownian motion. Find an appropriate relation to show that drift velocity and random motion are intimately connected. How can such a relationship be utilized for experimental confirmation of Einstein's formula for Brownian motion? Show theoretically that the existence of random force is essential to observe Brownian motion and hence identify the characteristic nature of the random forces. $2+3+2+3$
- By considering Langevin's description of Brownian motion, show that the random force is exactly counter balanced by the viscous force. Find the differential expression for the change in particle density with time in velocity space under no external force field for the Brownian particles, stating the significance of various terms appearing in the expressions. Determine the value

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