

Molecular Biophysics examination EXERCISES
via Zoom, February 8th 2022

Name:

Student ID number:

Place your student ID here
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1. Using an osmotic chamber the concentration of a certain protein was determined to be $40 \mu\text{M}$. Determine the height differences of the two water columns of the chamber caused by this protein concentration. Neglect virial-coefficients and mind the units! **4 points**

2. A lazy dog owner walks his dog by putting a GPS-device around the dog's neck and observes the dog's trajectory on his mobile device. After long-term observations, he determined that his dog walks nearly straight with a speed of $\sim 15\text{km/h}$ for 5 seconds, followed by ~ 5 seconds of waiting on the same place in order to sniffle or mark. After that the dog continues his journey by walking straight into a random direction and repeating the process of sniffing and marking. Determine the distance the dog travelled within one hour! Which distance has the dog owner to cover in order to pick up his dog after this hour? **6 points**

3. The rate constant of a chemical reaction at temperature T was found to be two times higher compared to the rate constant at $T/2$. Determine the activation energy as a function of $R.T$. **4 points**