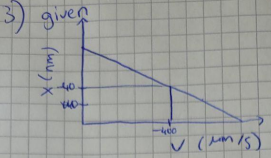


Nano Examen SS22

1. How does the surface-to-volume ratio increase if u decrease the system by 10.
Increase by 10
2. What about Reynolds number is wrong?
is bigger on microscopic scale than on macroscopic

3) given



given: $a = 0,27 \mu\text{m}$

what is the bending force of bending?
in $\frac{\text{N}}{\text{m}}$

1) calculate $F_{\text{foldes}} = 6 \pi \eta a v$

$$= 6 \pi \cdot \frac{1 \cdot 10^{-3} \frac{\text{Ns}}{\text{m}^2}}{(400 \cdot 10^{-6} \frac{\text{m}}{\text{s}})} \cdot 0,27 \cdot 10^{-6} \text{m}$$

$$= 2,03 \cdot 10^{-12} \text{ N}$$

$$= 2 \text{ pN}$$

2) $\frac{F_{\text{foldes}}}{x} = \text{answer}$

$$\frac{2 \text{ pN}}{40 \text{ nm}} = 0,05 \frac{\text{pN}}{\text{nm}}$$

answer was: $0,07 \frac{\text{pN}}{\text{nm}}$

4) what describes material that is pulled/tension?

- Young's modulus X
- bulk modulus
- shear modulus

22. Diffusion: what does it not depend on:

particle size

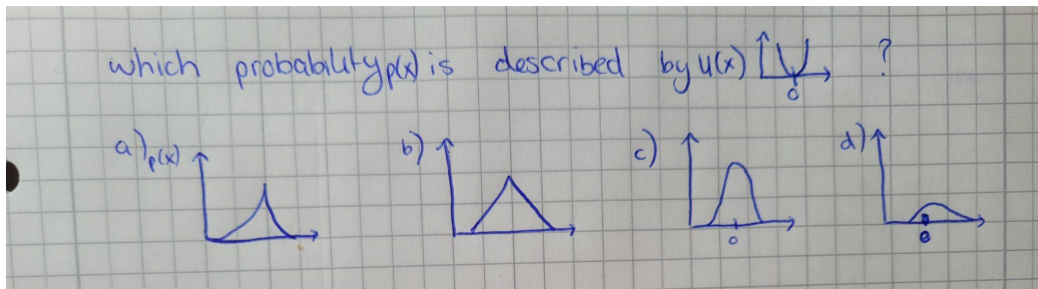
viscosity fluid

temperature

flow velocity of fluid (X)

24. Koff and kon given, calculate ccrit no formula

25. Fmax formula given, all values given calculate c0



Which picture shows a much larger length than persistence length?

- different lines shown and had to pick the correct one.
- Right answer was Scrambled

Calculate time to diffuse length l ? D and l given.

- $\text{time} = l^2/2D$

What is needed for magnetophoresis?

- inhomogeneous magnetic field

Calculate pressure in hydrophilic nanotube for a given radius. Only r given.

- 10 bar
- 100 bar
- 1 bar..

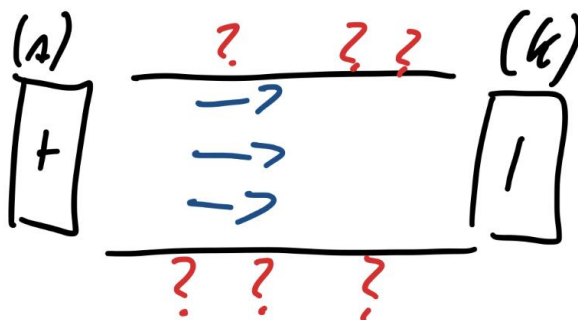
ΔG and l given, calculate F_{max} .

What is not correct about the WLC and FJC?

Increase radius of channel, what happens to flow rate and pressure?

- Q increases ΔP decreases

Anode, cathode, flow given. What is correct about the zeta potential?



- positive
- negative
- cannot say
- ...

What is the Debye length?

- average distance...

Two energy states (1 and 2) with $\Delta U = 0.7 k_B T$. How is the ratio between p_1 and p_2 ?

- $p_2 = 0.5P_1$