



TECHNISCHE
UNIVERSITÄT
WIEN

Statement under Oath

I,

name:

matriculation no:

date of birth:

declare in lieu of an oath that I am the person, who registered and who attends at the following exam using the TUWELL access data :

I declare that I solve the test tasks myself and without any help and that I do not use any illegal tools. I understand, that an untruthfully declaration will suspect me to an evaluation with mark "not sufficient" and also may have criminal law consequences.

Date (TT.MM.JJJJ)

signature of applicant



Biophysics exam sheet 1

Student: _____ matriculation number: _____

Date: 17.02.2022

Points

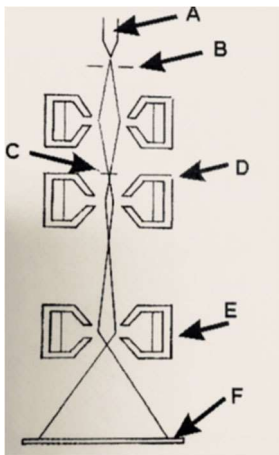
What is the key & lock model for an enzyme?

Please sketch a cell including the cell membrane. Label the cell organelles, and give a short description of their function.

Please sketch a RNA molecule and give an example of its function.

Describe the principle of electrophoresis using a sketch! Which voltage is required? Which carrier media are used?

Explain the principle of image formation in a transmission electron microscope (TEM). Label the parts (A-F) and briefly explain their function:



- A =
- B =
- C =
- D =
- E =
- F =

What is (a) the permittivity (b) the dispersion hub and (c) the dispersion frequency of a biological medium?

On which factors do (b) and (c) depend?

a) Permittivity:

b) Dispersion hub:

c) Dispersion frequency:



Biophysics exam sheet 3

Student: _____ matriculation number: _____

Date: 17.02.2022

Points

How is an action potential generated? Please briefly describe the according processes at the cell membrane.

The toxin tetrodotoxin (TTX) from the pufferfish selectively blocks the voltage gated sodium channels in nerve cells. Does this change the membrane resting potential (Please give a reason)?

What is the equilibrium potential for a specific ion sort (e.g. Na^+). How it is calculated (with equation)?



Biophysics exam sheet 4

Student: _____ matriculation number: _____

Date: 17.02.2022

Points

Please describe the neuronal effects of external electrical fields:

Was ist die Definition der komplexen Permittivität? Bitte skizzieren sie die Ortskurve der komplexen Permittivität.

Please discuss the course of the threshold current density for sinusoidal excitation current.