Take Home Exam 0I: Surface to Volume Ratio

## Assigned: 08/22/2022

Due (as pdf by email) 08/24/2022 (two days)

•you will receive a simple letter grade for your report

•You may submit your answers in one of two ways:

1. For typed answers: as a .docx file (as is) or converted into a pdf file. (DO NOT SEND GOOGLE DOC)

For handwritten answers: Please scan as images, and group together into one pdf file. Or you may hand them manually to my office (ECME-212)

## HW 01.1

In this problem you are asked to calculate the (approximate) ratio of the number of molecules of water residing on the surface, versus within the bulk for a spherical droplet of water with a radius of 10 nm.

Hints:

•Calculate the effective volume of one water molcule (it would be equal to the volume of one mole of water - equal to the molecular weight divided by the density of water - divided by the Avogadro's number.

•Let us call the volume per molecule calculated above as  (it will have units of m3 or nm3)

•From dimensional analysis the footprint of one molecule will be .

Now from the surface to volume ratio you will be able to calculate the ratio as requested.