siunitx

Department of Bitechnology
Biomolecular simulation BT2123
Fall semester Jan-May 2023
Quiz 1
January 12, 2023

Maximum Marks: 20

Maximum Time: 30 minutes

If required, please use/write the approximate values of the desired constant

Maximum Time: 30 mintuts

1. What is the main difference between gravitational and electrostatic forces? Can gravitational or electrostatic forces be negative ?

2. What is the MKS unit of electrostatic potential, V. Electron volt eV is unit of which quantity and what is value of 1 eV in MKS units?

3. What is the numerical value of Boltzmann constant

4. Calculate the ratio of gravitational and electrostatic force between a P atom of DNA and Na^+ ion separated by a distance of 10 $\mathring{A}$ in vacuum. The masses of P atom and Na^+ ion are 30.97 and 22.99 amu respectively, while the charges are -2e and +1e respectively.

   Given that

   1 $e = 1.602 \times 10^{-19}$ coulomb.

   1amu = 1.66×10^{-27} kg.

   permittivity of free space 8.85×10^{-12} F/m

   gravitational force constant is 6.67×10^{-11} m ^{3} $kg^{-1}s^{-2}$