ADVANCED DYNAMICS — PHY 4241/5227

SOLUTIONS – SET 8

(February 20, 2009)

(34) SI Units. For up-to-date information visit the NIST website.

1. The second [s] is defined, so that the frequency of light between the two hyperfine levels of the ground state of the cesium ^{132}Cs atom is exactly 9,192,631,770 cycles per second.
2. The meter [m[is defined, so that the speed of light in vacuum is exactly 299,792,458 [m/s].
3. A one kilogram weight is kept at Sèvres near Paris.
4. $1\ \mathrm{N} = 1\ \mathrm{kg} \cdot \mathrm{m/s^2}$.
5. If two very long parallel wires one meter apart carry equal currents, the current in each is defined to be one Ampere [A] when the force per unit length on each wire is $2 \times 10^{-7}\,[\mathrm{N/m}]$.
6. One Coulomb [C] is the charge flowing through a cross-sectional area of a wire in one second when the current in the wire is one Ampere: $\mathrm{C} = \mathrm{A} \cdot \mathrm{s}$.
7. $\mu_0 = 4\pi \times 10^{-7}\ \mathrm{N/A^2}$.
8. $\epsilon_0 = 8.85418782 \times 10^{-12}\ \mathrm{C^2/(N \cdot m^2)}$.