

ADVANCED DYNAMICS — PHY 4241/5227
SOLUTIONS – SET 9

(30) 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. $1 \text{ N} = 1 \text{ kg} \cdot \text{m}/\text{s}^2$.
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 $2 \times 10^{-7} \text{ [N/m]}$.
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: $\text{C} = \text{A} \cdot \text{s}$.
7. $\mu_0 = 4\pi \times 10^{-7} \text{ N/A}^2$.
8. $\epsilon_0 = 8.85418782 \times 10^{-12} \text{ C}^2/(\text{N} \cdot \text{m}^2)$.