# THERMAL AND KINETIC PHYSICS   (PHY 214)

## PHYSICAL CONSTANTS

$$1 \text{ amu} = 1.66 \times 10^{-27} \text{ kg}$$

$$1 \text{ eV} = 1.60 \times 10^{-19} \text{ J}$$

$$N_A = Avogadro\ number = 6.02 \times 10^{23} \text{ mol}^{-1}$$

$$c = Speed\ of\ light\ in\ vacuum = 3.00 \times 10^8 \text{ m s}^{-1}$$

$$k_B = Boltzmann\ constant = 1.38 \times 10^{-23} \text{ J K}^{-1} = 8.63 \times 10^{-5} \text{ eV K}^{-1}$$

$$R = Gas\ constant = 8.31 \text{ J mol}^{-1} \text{ K}^{-1}$$

$$T_s = Ice\ point\ of\ water = 273.15 \text{ K}$$

$$P_s = Atmospheric\ pressure = 1 \text{ atm} = 1.01 \times 10^5 \text{ Pa}$$

$$\sigma = Stefan-Boltzmann\ constant = 5.67 \times 10^{-8} \text{ W m}^{-2} \text{ K}^{-4}$$

$$c_P = Specific\ heat\ of\ water\ at\ constant\ pressure = 4.2 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$$

$$c_P^{ice} = Specific\ heat\ of\ ice\ at\ constant\ pressure = 2.1 \times 10^3 \text{ J kg}^{-1} \text{ K}^{-1}$$

$$\ell = Latent\ heat\ of\ melting\ ice = 3.33 \times 10^5 \text{ J kg}^{-1}$$