Quiz 1—Environmental Measurements

CENG 340–Introduction to Environmental Engineering
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Name:

(Modified from Mihelcic and Zimmerman) Ice resurfacing machines (aka Zambonis) use internal combustion vehicles that give off exhaust containing carbon monoxide (CO) and nitrogen oxides (NO_x). The outdoor air-quality, 1-h standard of CO is set at 30 ppm_v. Average 1-h CO concentrations at Lynah Rink have been reported to be as high as 30 mg/m^3. Assume that the temperature and pressure at Lynah equal 25 ^{0}C and 1 atm, respectively. In addition, note that (1) temperature in Kelvin (K) = temperature in Celsius (^{0}C) + 273.15; (2) MW_C = 12 g/mole and MW_O = 16 g/mole; and (3) the ideal gas constant R = 8.205×10^{-5} $\frac{m^3 \times atm}{mole \times Kelvin}$.

1. Does the concentration of CO at Lynah violate the outdoor air quality standard (show your work) [6 points]?

2. Calculate the partial pressure (in units of atm) of CO in the rink [2 points].

3. Report the concentration of CO at Lynah in units of moles/L [2 points].