

# Physics 1114 - General Physics I

Quiz #36 - 2012.11.26

## Solutions

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1. We are used to seeing the equation corresponding to the behavior of an ideal gas, as given by  $pV = nRT$ , where  $p$  is pressure,  $V$  is volume,  $n$  is the number of moles of the gas, and  $T$  is the temperature. What is  $R$  and what are its labels?

The constant  $R$  is the ideal-gas constant. In SI units, it is given by  $8.3145\text{J}/(\text{mol}\cdot\text{K})$ , so the units are  $\text{J}/(\text{mol}\cdot\text{K})$ .

2. In a similar fashion, we can express the ideal-gas equation as  $pV = NkT$ . How does this equation differ from  $pV = nRT$ ?

This is the ideal-gas equation on a molecular level, as opposed to the molar level for the standard equation. Here,  $N = N_a n$  and  $R = N_a k$ , where  $N_a$  is Avogadro's number.