1. Write down the First Law of Thermodynamics in the form of an equation and label what each term means.

2. Write down the equation that describes the internal energy of a monatomic ideal gas in terms of temperature.

3. Write down the equation that describes the average energy of a single monoatomic gas particle. What is the total energy of $N$ gas particles?

4. The equation in 2 and the second equation in 3 should be very similar. Using their similarity, infer how the two constants ($R$ and $k$) are related to each other for $n=1$ mole? (hint: They are related through another well-known constant).