

Stuff for Thursday, May 10, 2012

- PS #12 due up front. 1094 session returned.
- Quiz #6 tomorrow on Q12, Q13, Q14
- Residual Q12–Q15 things:
 - Fission and fusion
 - Is low-level radioactivity harmful? Cellphones and cancer?

T1 and T2 stuff:

- Specific heat c : $dU = mc dT$ or $c \equiv \frac{1}{m} \frac{dU}{dT}$
- Ideal gas law: $PV = Nk_B T$ with $k_B = 1.38 \times 10^{-23}$ J/K
- Temperature and energy:

$$K_{\text{avg}} = \frac{1}{2} [mv^2]_{\text{avg}} = \frac{3}{2} k_B T \quad \Rightarrow \quad v_{\text{rms}} \equiv \sqrt{[v^2]_{\text{avg}}} = \sqrt{\frac{3k_B T}{m}}$$

- Thermal energy of a gas: $U = \frac{f}{2} Nk_B T$
 - Near room T , $f \approx 3$ (monatomic gas), $f \approx 5$ (diatomic gas), and $f > 6$ (polyatomic gas)
 - f is called the number of molecular “degrees of freedom”