CHEM 3620 – Exam 2 Equations

Q: Why does eating a hamburger give you less energy than eating a steak?

$$\hat{H}\psi = -\frac{\hbar^2}{2m}\nabla^2\psi + V\psi = E\psi$$

Spherical Polar Coordinates

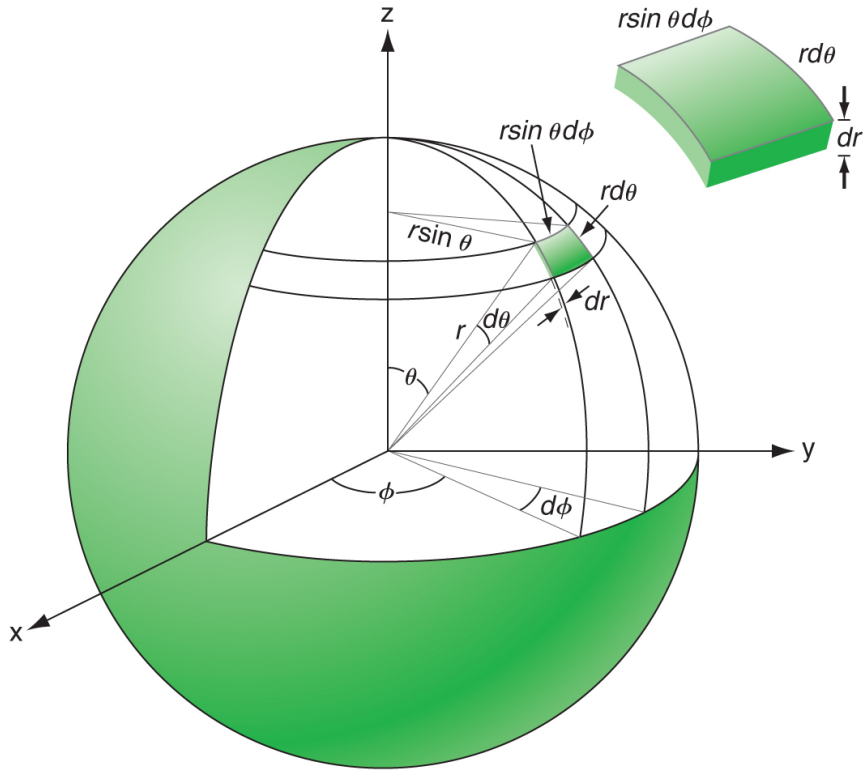

Table of Particle Properties

Name	Symbol	Value	Units
Elementary Charge	e	1.602177×10^{-19}	C
Electron Rest-Mass	m_e	9.109382×10^{-31}	kg
Proton Rest-Mass	m_p	1.672622×10^{-27}	kg
Neutron Rest-Mass	m_n	1.674927×10^{-27}	kg

A: Because hamburger is the ground state of beef.

$$\tilde{\nu} = \tilde{R}_H \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

$$\tilde{\nu} = \frac{1}{\lambda\,(cm)} = \frac{\nu}{c\,(cm/s)}$$

$$\tilde{R}_H = 109677\,cm^{-1}$$

$$R_{n,l}(r) = N_{n,l}\rho^l L_{n-l-1}^{2l+1}(\rho)e^{-\rho/2}$$

$$P(r) = r^2\,|R(r)|^2$$

$$\mu_{jk} = \int \psi_j^* \hat{\mu} \psi_k \mathrm{d}\tau$$

$$\tilde{\nu} = E_{KE} + \phi$$

$$\psi = c_A\chi_A + c_B\chi_B$$

$$\chi = \frac{1}{2}\,(I + E_{ea})$$

$$|\chi_A - \chi_B| = \left[D_0(AB) - \frac{1}{2}\,(D_0(AA) + D_0(BB)) \right]^{1/2}$$

$$E_{\pm} = \frac{\alpha \pm \beta}{1 \pm S}$$

$$E_{\pm} = \frac{1}{2}\,(\alpha_A + \alpha_B) \pm \frac{1}{2}\,(\alpha_A - \alpha_B) \left[1 + \left(\frac{2\beta}{\alpha_A - \alpha_B} \right)^2 \right]^{1/2}$$

$$c_A = \frac{1}{\sqrt{2(1 \pm S)}}$$

$$c_B = \pm c_A$$

$$c_A = \left[1 + \left(\frac{\alpha_A - E}{\beta} \right)^2 \right]^{-1/2}$$

$$c_B = \left[1 + \left(\frac{\beta}{\alpha_A - E} \right)^2 \right]^{-1/2}$$

$$h = 6.626 \times 10^{-34} J\,s$$

$$\hbar = 1.055 \times 10^{-34} J\,s$$