Homework 12-A

A particle (mass m) is contained in a right circular cylinder (pillbox) of radius R and neight H. The particle is described by a wave function satisfying the Schrödinger wave equation

$$-\frac{\hbar^2}{2m}\nabla^2\psi(\rho,\varphi,z) = E\psi(\rho,\varphi,z)$$

and the condition that the wave function go to zero over the surface of the pillbox. Find the lowest (zero point) permitted energy.

$$E_{\min} = \frac{\hbar^2}{2m}\left[\left(\frac{2.405}{R}\right)^2 + \left(\frac{\pi}{H}\right)^2\right],$$

This problem is worked out in our text pages 422-424.