Solution to be submitted by 27/01/2018

1. The particle in a infinite box problem can be solved by a alternative method which we will use in the case of the simple harmonic oscillator. The particle in a box problem for a zero potential inside the box and infinite potential energy outside the box of length L is given by:

$$\frac{d^2\psi}{dx^2} = -\frac{2mE}{\hbar^2}\psi = -k^2\psi$$

Take:

$$\psi(x) = a_0 + a_1 x + a_2 x^2 + \ldots + a_n x^n + \ldots$$

as a form for ψ. Apply appropriate boundary conditions and solve and obtain the usual form for $\psi(x)$.