CL21_Q1. Graphically represent the wave functions and the corresponding probability density for first three quantum states for a particle trapped in a one dimensional finite potential well.

Ans:

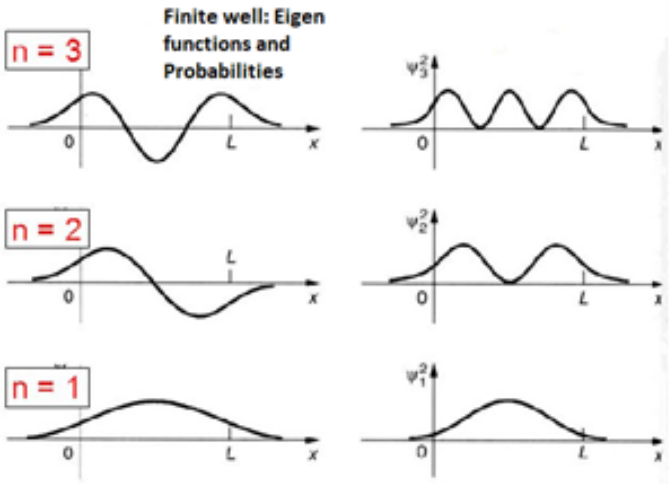

Image courtesy: adapted from slide share

CL21_Q2.The energy values of a finite potential well are less than the corresponding state of an infinity potential well. Explain why?

Ans:

Energy values for an infinite well is given by $E_n = \frac{h^2 n^2}{8mL^2}$ where n = 1,2 3…

First quantum state for n=1. Second state for n=2 and third quantum state for n=4.

In the case of an identical finite potential well the energy of the particle can be written as

$$\boldsymbol{E_{finite}} = \frac{\boldsymbol{h^2\pi^2n^2}}{\boldsymbol{2m(width\ of\ the\ well\ where\ \psi \to 0)^2}} = \frac{\boldsymbol{h^2\pi^2n^2}}{\boldsymbol{2m(L+2\Delta x)^2}},$$ where n=1,2,3…..

We can see that the energy values are less than the energy values for the corresponding states of an infinite potential well of the width L.