

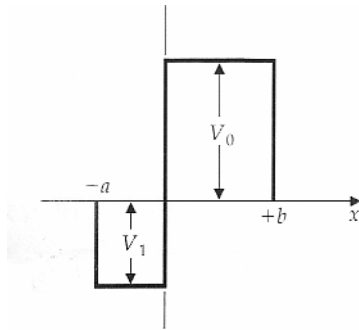
2006-11-20 Problem Set

(Our book doesn't have enough problems on this material!).

Problem 1:

In class on Nov 17 we started discussion of the potential step, shown in Fig. 6-21. In Eqs. (6-63) and (6-64) the book writes solutions of the TISE in Region I ($x < 0$) and Region II ($x > 0$). These equations are for the case where the energy E is greater than the height of the step height V_0 ($E > V_0$).

Here is a picture of another potential energy function that has several steps.



- How many regions does this potential energy function have?
- For each of the regions that you identified in (a), write a solution of the TISE that is analogous to the equations in the book. Do this for the case where $E > V_0$.
- For each of the regions write a formula for the wavevector k that applies to that region (like the equations for k_1 and k_2 in the unnumbered equation between Eq. (6-62) and Eq. (6-63).

We didn't finish the solution of the potential step on Nov 17, but the next two problems can be done without knowing the rest of that solution.

Problem 2: Tipler, chapter 6, problem 43.

Problem 3: Tipler, chapter 6, problem 45.

Problem 4: Tipler, chapter 6, problem 50

Instead of using the infinite square well, use the energy spectrum of the simple harmonic oscillator. Are the answers for the infinite square well and the simple harmonic oscillator similar?