Q & A for Jackson 3.10 (thanks to Colin for the questions):

I have a couple questions. The first one involves choosing the correct Bessel function. Since V=0 at z = 0, L, I chose Z=sin(n*pi*z/L). This means I choose the Bessel functions of I and K, correct? *Ans: Yes, correct.*
All as I have in the notes is that if Z is sinusoidal, we choose this set of Bessel functions. Is this because there needs to be some exponential in the solution? *Ans: Yes, correct, "exponential-like" would be a better term, i.e., non-oscillatory.*
Or is there a different reason as to why these functions are needed? I know this was covered in class, but I was slightly confused by it. *Ans: You're right that it was covered in class. The idea is that the Laplace equation leads to "normalized second-derivatives" (quantities like Y"/Y) for all three dimensions which must add to zero. If two are oscillatory (as in this case), then the last must not be, otherwise all three would be negative and cannot add to zero!*

And when calculating out the coefficients, A and B, I'm confused as to what the factor in front of the integral should be. I have an integral over z, and an integral over phi. For the phi integral, I think I should have a normalizing factor of 1/pi. For the z integral, I think I will need a normalizing factor of 2/L, similar to equation 2.37 in Jackson. Am I correct in doing this or is there another factor I'm missing? I am confusing myself trying to sort through 3.7 and 3.8 in Jackson (he has a lot different coefficients) so I want to make sure I am on the right track as I'm solving this problem.
Ans: You seem to have the correct factors (except for the m=0 case, where the integral is zero so it does not matter).