1 Quiz: Summation Notation, Version 0

Write out the terms in the following sums that have the lowest energy. Stop when you have at least 9 terms, but only stop at some point that is logical, given the symmetries and degeneracies. Briefly explain why you chose to stop when you did. You may have to guess what system you are working from the form of the sum and which eigenvalue(s) determine the energy. You may assume that low energies correspond to eigenvalues near zero. Clearly state any assumptions that you make. You may use bra/ket notation in your solutions. (If these directions are unclear, check out the solutions below for some examples.)

(a)

$$\sum_{m=-\infty}^{\infty} c_m e^{im\phi}$$

(b)

$$\sum_{m=1}^{\infty}\sum_{n=1}^{\infty} c_{mn} \sin\left(\frac{m\pi x}{L_x}\right) \sin\left(\frac{n\pi y}{L_y}\right)$$

(c)

$$\sum_{n=1}^{\infty}\sum_{\ell=0}^{n-1}\sum_{m=-\ell}^{\ell} c_{n\ell m} \left|n, \ell, m\right\rangle$$