Phys604/F15/Hassam/Problem Set 11 **Due 11/24/15**

11.1

1. Solve Laplace's Equation, $\nabla^2\psi = 0$, for $\psi(\mathbf{x})$ inside an infinite cylinder of radius a, if ψ on the surface = $V(\phi)$, where V is a given function. State explicitly how and why your separation constant is quantized. Assume that $V(\phi)$ is odd in ϕ and thus pick your function basis conveniently. Leave your answer in terms of integrals over V but evaluate explicitly other coefficients.

2. We modify the previous problem to include an inner concentric cylinder of radius b < a. Let $\psi = 0$ on the inner cylinder. Find ψ in the annulus if all else is unchanged.

3. The cylinder in the first problem is now cut into a pizza shape (see Fig), with boundary conditions as shown. V has no obvious symmetry. Find ψ inside the pizza.