PHYS-4602 Homework 10 NOT TO BE MARKED

This homework is for study purposes and will not be marked. A solution will be posted prior to the exam.

1. **Scattering from a Spherical Shell Potential** *from Griffiths 2nd ed 11.13*

   Consider scattering from a spherical shell potential $V(r) = \alpha\delta(r - a)$ for constant a, α. Work in the Born approximation. Note that the scattering amplitude $f(\theta, \phi) = f(\theta)$ depends only on the scattering angle due to spherical symmetry. The scattered particle has mass m.

   (a) Find the scattering amplitude for low energy scattering $ka \ll 1$.

   (b) Use the spherical symmetry to find the scattering amplitude as a function of the incoming wave energy E for all energies. Show that you find your previous result in the low energy limit.

   (c) What are the differential cross section and total cross section in the low energy limit?